A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, D. J. Horne, J. W. Neale,
and David J. Siveter

Volume 14, 1987

Part 1 (pp.1–72); 30th May, 1987
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Instructions to Authors

Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the majority of papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

The front cover shows a left valve of *Neolimnocythere hexaceros* Delachaux, 1928, from Quaternary Deposits at Lago Junin, Peru. Photograph by Dr P. De Deckker, University of Monash, Victoria, Australia.

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595.337.14 (119.4) (265.72 : 161.108.21 + 161.109.21) : 551.351 + 552.51 + 52

ON *CATHAYCYTHERE RETICULATA* WHATLEY & ZHAO gen. et sp. nov.

by Robin Whatley & Zhao Quanhong
(University College of Wales, Aberystwyth, UK & Tongji University, Shanghai, China)

Genus *CATHAYCYTHERE* gen. nov.

Type-species: *Cathaycythere reticulata* gen. et sp. nov.

Derivation of name: From Cathay (China) + cythere; with reference to the type locality of the type-species in the South China Sea.

Diagnosis: Medium sized; subrectangular in lateral view, highest anterodorsally and longest subventrally; anterior margin broadly rounded; posterior margin truncate above and bluntly pointed below. Carapace laterally compressed at both end margins. Eye-tubercle and internal ocular sinus absent. Surface coarsely and irregularly reticulate with a prominent subcentral node surrounded by a subcircular sulcus. Hinge holamphidont with high conical anterior tooth, bulbous posterior tooth and locellate median element in right valve. Inner lamella wide with a marked oval excavation posteriorly aligned parallel to the postero-dorsal slope of the posterior margin; very narrow vestibulae at each end; radial pore canals few, long, thin and simple. Adductor scars relatively small, consisting of a vertical row of four; frontal scar single, oval.

Explanation of Plate 14, 2

Fig. 1, RV, ext. lat. (holotype, **1986.404**, 710μm long); fig. 2, LV, ext. lat. (paratype, **1986.405**, 665μm long); fig. 3, LV, ext. lat. (paratype, **1986.406**, 665μm long).
Scale A (100μm; ×90), figs. 1-3.

Remarks: The excavation on the wide posterior inner lamella is not known to occur in any other genus and can be used to distinguish it from *Sinocythere* Hou, 1978. The latter is closest in ornament and muscle scar pattern to the present genus, but differs in hingement (hemiamphidont with clearly crenulate posterior tooth) and in lacking the posterior excavation on the inner lamella. *Krithe* exhibits a similar excavation posteriorly but it occurs distal to the selvage whereas in *Cathaycythere* it is proximal. The familial status of *Cathaycythere* is uncertain and possibly a new family is required to accommodate this genus and *Sinocythere* (see Whatley & Zhao, *Stereo-Atlas Ostracod Shells* **14**, 5-8, 1987).

Cathaycythere reticulata Whatley & Zhao gen. et sp. nov.

Holotype: British Museum (Nat. Hist.) no. **1986.404**; RV.
[Paratypes: British Museum (Nat. Hist.) nos. **1986.405-409.**]

Type locality: Off Guangsi Province of China, Gulf of Tonkin, South China Sea; lat. 21° 29′ 09″N, long. 108° 44′ 46″E. Recent, water depth: 14m.

Derivation of name: With reference to its reticulate surface.

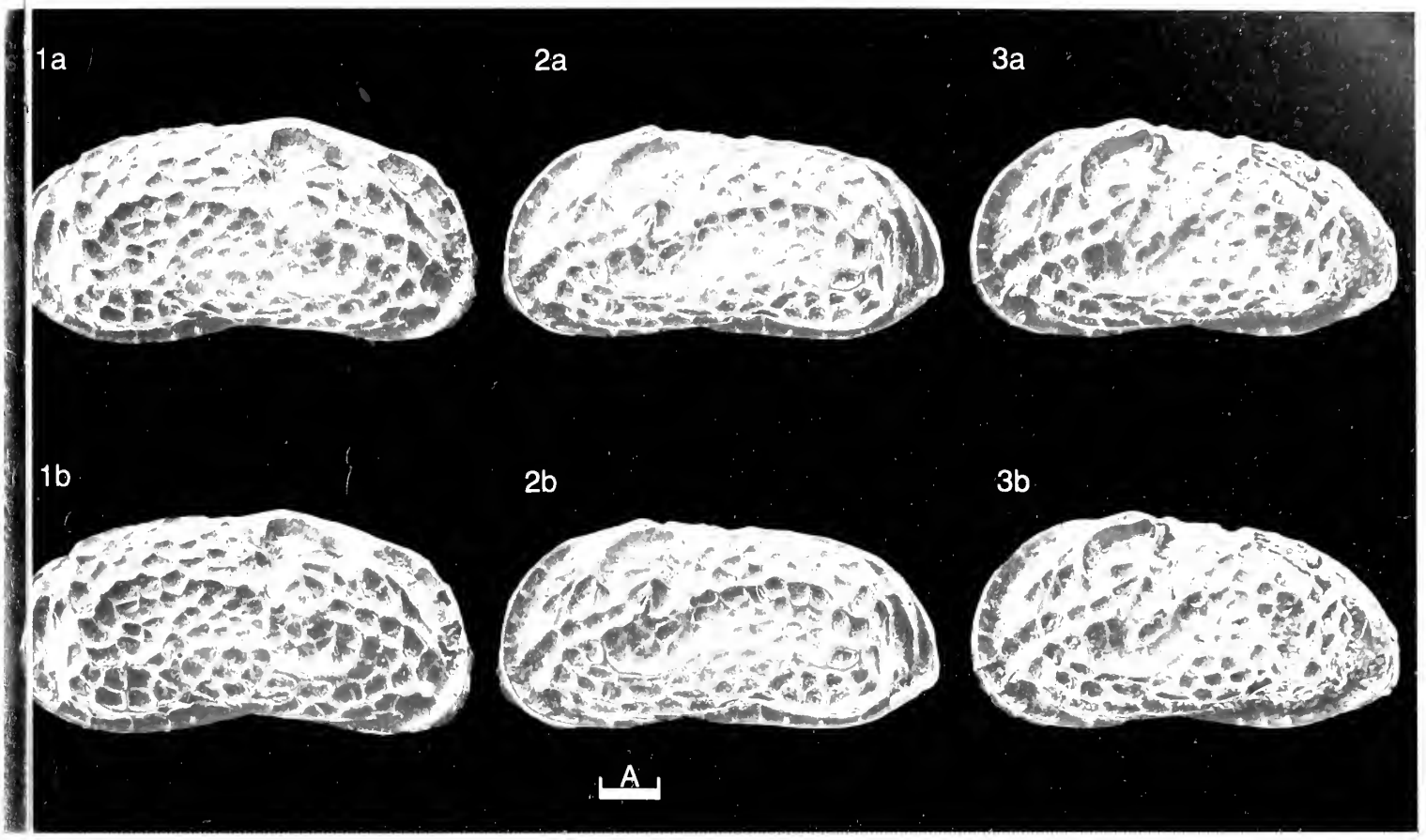
Figured specimens: British Museum (Nat. Hist.) nos. **1986.404** (holotype, RV: Pl. **14**, 2, fig. 1), **1986.405** (paratype, LV: Pl. **14**, 2, fig. 2), **1986.406** (paratype, LV: Pl. **14**, 2, fig. 3), **1986.407** (paratype, car.: Pl. **14**, 4, fig. 1), **1986.408** (paratype, LV: Pl. **14**, 4, fig. 2), **1986.409** (paratype, RV: Pl. **14**, 4, fig. 3). Nos. **1986.404-406** are from the type locality. Nos. **1986.407-409** are from lat. 21° 15′ 46″N, long. 109° 24′ 57″E; Recent, water depth: 14m.

Diagnosis: As for the genus. Monotypic.

Distribution: In four bottom samples off Guangsi Province, China, northern Gulf of Tonkin, South China Sea. Water depth: 10 – 16m; substrate: mud to fine sand.

Explanation of Plate 14, 4

Fig. 1, car., ext. dors. (paratype, **1986.407**, 635μm long); fig. 2, LV, int. lat. (paratype, **1986.408**, 635μm long); fig. 3, RV, int. lat. (paratype, **1986.409**, 645μm long).
Scale A (100μm; ×90), figs. 1-3.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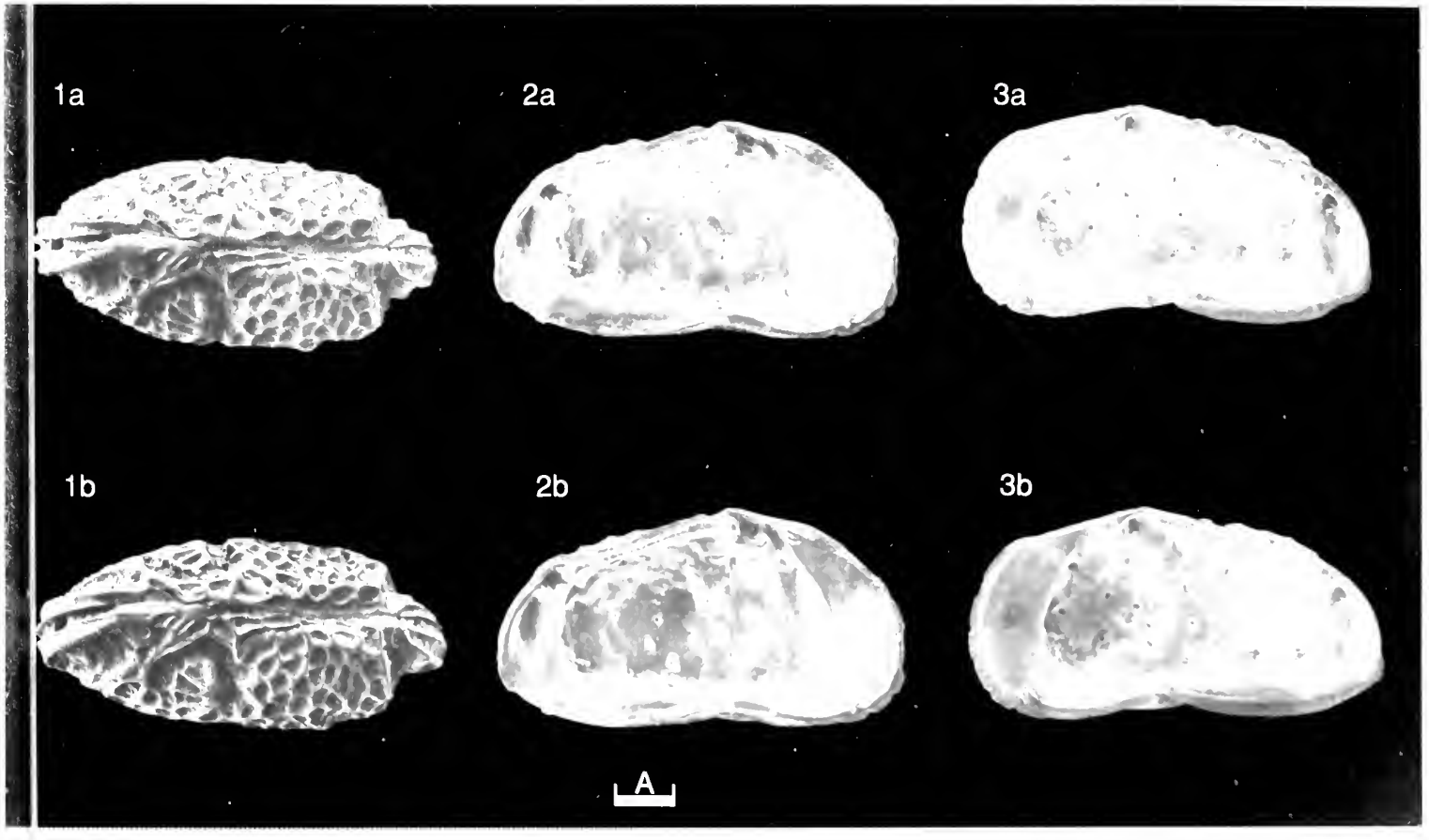
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595.337.14 (119.9) (510 : 161.120.34) : 551.351

ON *SINOCYTHERE SINENSIS* HOU

by Robin Whatley & Zhao Quanhong
(University College of Wales, Aberystwyth, UK & Tongji University, Shanghai, China)

Genus *SINOCYTHERE* Hou, 1982

Type-species (by original designation): *Sinocythere sinensis* Hou, 1982

Diagnosis: Medium sized; subrectangular in lateral view with parallel dorsal and ventral margins, prominent posterior cardinal angle and obtusely rounded posterior margin. Eye-tubercle weakly developed but internal ocular sinus not developed. Surface reticulate with an anteromedian node surrounded by a subcircular sulcus. Hinge hemiamphidont: anterior tooth in right valve conical, posterior tooth curved and distinctly dentate; in left valve, anterior socket enclosed ventrally by an anterior extension of the anteromedian conical tooth, posterior socket with an anti-slip toothlet ventromedianly, and median bar denticulate. Inner lamella relatively wide with shallow anterior vestibule; radial pore canals few, thin and simple. Adductor muscle scars small, consisting of a vertical row of four scars all in contact; frontal scar single, oval.

Remarks: This genus is close to *Spinoleberis* Hanai, 1961 in many features except that the latter has a triangular outline and much narrower, more acute posterior margin in lateral view, and three longitudinal ribs. In external characters *Sinocythere* is somewhat similar to *Palmenella* Hirschman, 1916, but the latter bears a schizodont hinge. *Cathaycythere* Whatley & Zhao, 1987 (*Stereo-Atlas Ostracod Shells* **14**, 1-4) has similar ornament and also the circular sulcus surrounding the anteromedian node. The two genera differ in hingement and *Sinocythere* lacks the excavated posterior inner lamella so typical of *Cathaycythere*. *Sinocythere* and *Cathaycythere* are probably worth including in a new family of Cytheracea.

Explanation of Plate 14, 6

Fig. 1, ♂ RV, ext. lat. (**1986.410**, 570μm long); fig. 2, ♀ car., rt. lat. (**1986.411**, 540μm long); fig. 3, ♀ car., lt. lat. (**1986.411**, 540μm long). Scale A (100μm; ×110), figs. 1-3.

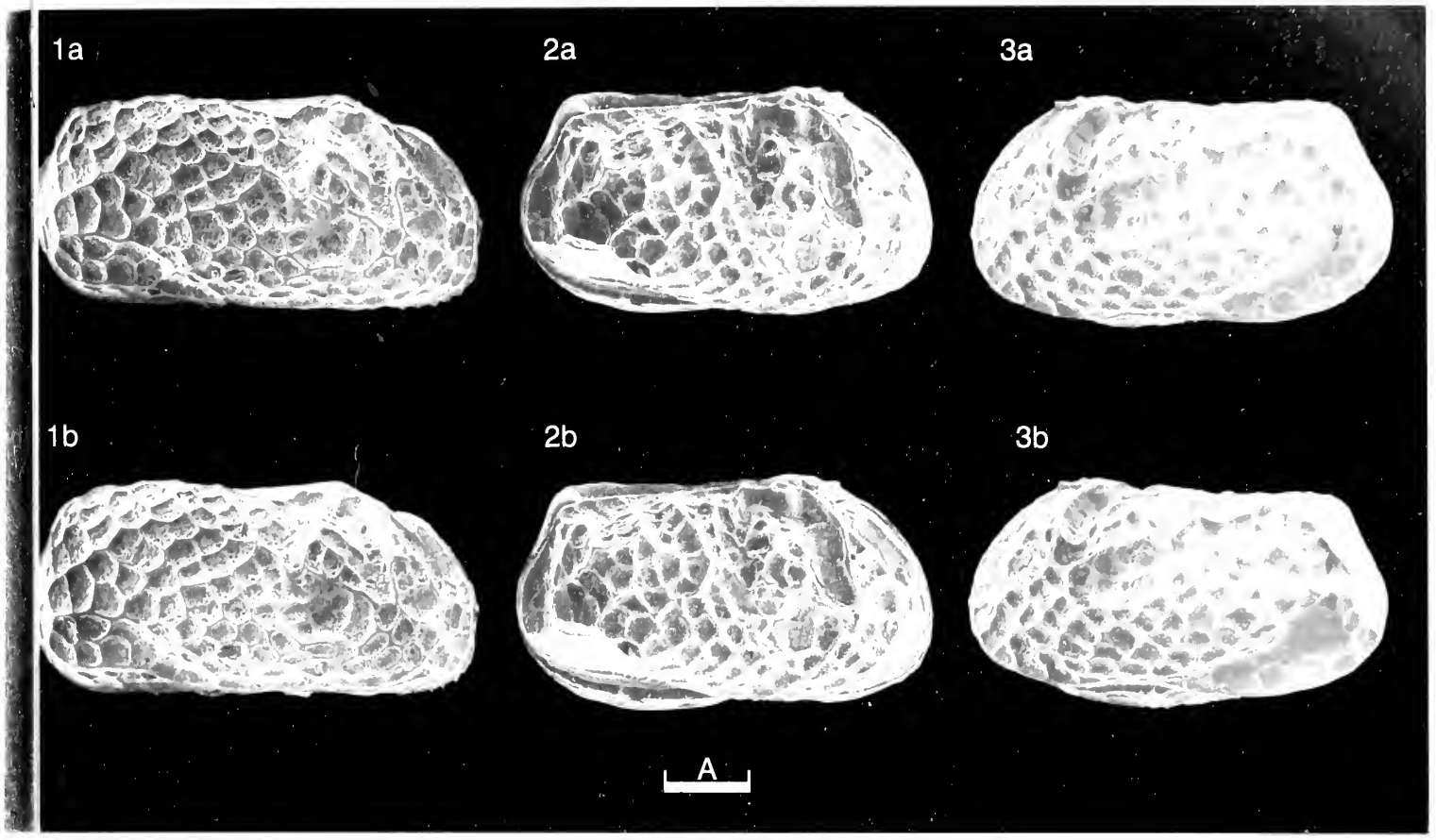
Sinocythere sinensis Hou, 1982

1982 *Sinocythere sinensis* sp. nov. Hou *in* Hou *et al.*, *Cretaceous-Quaternary ostracode fauna from Jiangsu*, 242, text-fig. 77; pl. 87, figs. 16-19.
1985 *Sinocythere sinensis* Hou; Zhao, *Acta Oceanologica Sinica*, pl. 2, fig. 10.
1985 *Sinocythere sinensis* Hou; Wang and Zhao, *in* Wang *et al.*, *Marine Micropaleontology of China*, pl. 18, fig. 4.

Holotype: Nanjing Institute Geology & Paleontology, Academia Sinica; no. **4107**, ♀ LV. Not figured herein.
Type locality: Jiangsu Province, Eastern China; Dongtai Formation, Quaternary.
Figured specimens: British Museum (Nat. Hist.) nos. **1986.410** (♂ RV: Pl. **14**, 6, fig. 1; Pl. **14**, 8, fig. 3), **1986.411** (♀ car.: Pl. **14**, 6, figs. 2, 3; Pl. **14**, 8, fig. 1), **1986.412** (♀ LV: Pl. **14**, 8, fig. 2). All Recent, collected from the littoral of Jiangsu Province, China; approx. lat. 34° 17′N, long. 120° 17′E.
Diagnosis: Irregularly polygonal surface reticulation with superimposed narrow, oblique posterodorsal-anteroventral rib, and a bifid rib running from the anterior cardinal angle obliquely to mid-anterior. Female carapace strongly laterally compressed posterodorsally, posteriorly and ventrally; the male is inflated in these areas.
Remarks: This species is very close to *S. dongtaiensis* Chen, 1982 in outline and overall ornamentation, but the latter is much more weakly reticulate.
Distribution: Pliocene to Recent, Eastern China. Recent specimens most abundant in littoral zone and inner shelf shallower than 20m, rare in estuaries and water depths from 20 to 200m.

Explanation of Plate 14, 8

Fig. 1, ♀ car., ext. dors. (**1986.411**, 540μm long); fig. 2, ♀ LV, int. lat. (**1986.412**, 490μm long); fig. 3, ♂ RV, int. lat. (**1986.410**, 570μm long).
Scale A (100μm; ×110), figs. 1-3.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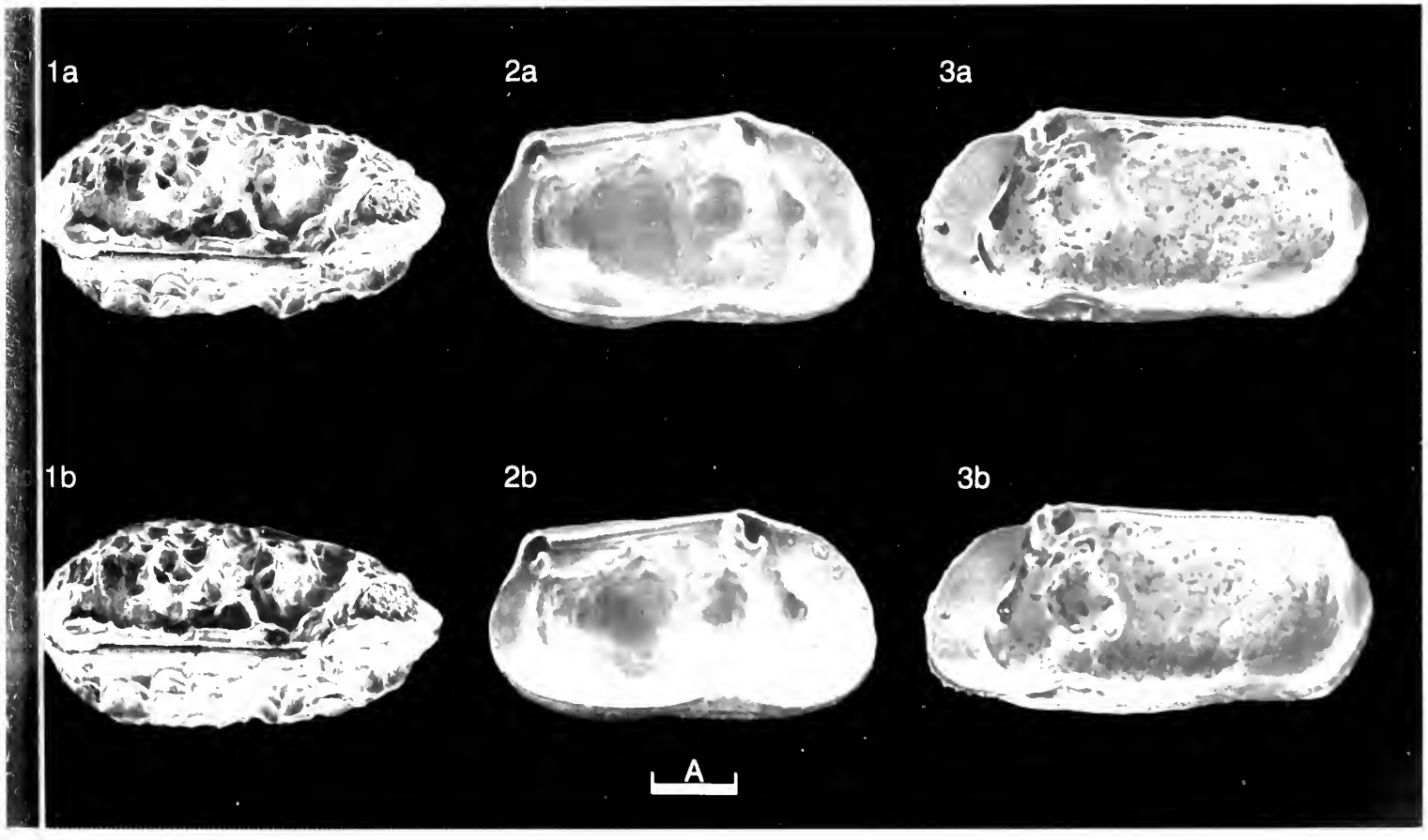
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595.337.14 (119) (510 : 161.120.34) : 551.313.1 + 551.35

ON *ALBILEBERIS SINENSIS* HOU

by Zhao Quanhong & Robin Whatley
(Tongji University, Shanghai, China & University College of Wales, Aberystwyth, UK)

Genus *ALBILEBERIS* Hou, 1982

Type-species: *Albileberis sinensis* Hou, 1982

Diagnosis: Small to medium, laterally compressed; subovate to rectangular in lateral view with greatest height anteromedianly. Bluntly truncate posterior and well rounded anterior margins. Surface smooth, pitted or reticulate. Hinge between paleomerodont and holomerodont; all positive elements in right valve, long ridge-like anterior tooth thickened anteriorly with a prominent square terminal toothlet, median bar smooth anteriorly and faintly crenulate posteriorly, posterior tooth curved and denticulate. Complementary negative elements in left valve with an anti-slip bar below median groove and anterior socket, and two small terminal anti-slip toothlets respectively at anterior and posterior ends. Inner lamella moderately wide with large vestibulae and narrow fused zone; radial pore canals moderate in number and simple. Adductor muscle scars a vertical row of four; frontal scar V-shaped; fulcral point crescentic and prominent.

Remarks: Although the generic name *Albileberis* was first published in Guan *et al.* (*Paleontological Atlas of Central & S China (4): Ostracoda*, 1978), who attributed the genus to Hou from an earlier MS name, its type-species was not published until 1982 (Hou *in* Hou *et al.*). This genus is easily identified by its laterally compressed carapace, outline and peculiar hingement, and probably belongs to the Cytherideinae based on its internal characters.

Explanation of Plate 14, 10

Fig. 1, ♀ RV, ext. lat. (**1986.413**, 525μm long); fig. 2, ♀ LV, ext. lat. (**1986.414**, 525μm long); fig. 3, ♂ LV, ext. lat. (**1986.415**, 495μm long).

Scale A (100μm; ×120), figs. 1-3.

Albileberis sinensis Hou, 1982

1982 *Albileberis sinensis* sp. nov. Hou, *in* Hou *et al.*, *Cretaceous-Quaternary ostracode fauna from Jiangsu.*, 240-241, text-fig. 75, pl. 88, figs. 1-7.

1985 *Albileberis sinensis* Hou; Zhao, *Acta Oceanological Sinica*, pl. 1, fig. 9.

1985 *Albileberis sinensis* Hou; Wang & Zhao, *in* Wang *et al.*, *Marine Micropaleontology of China*, pl. 7, fig. 2, text-fig. 5.

Holotype: Nanjing Institute Geology & Paleontology, Academia Sinica; no. **41062**; ♀ LV. Not figured herein.

Type locality: Jiangsu Province, E China; Dongtai Formation, Quaternary.

Figured specimens: British Museum (Nat. Hist.) nos. **1986.413** (♀ RV: Pl. **14**, 10, fig. 1), **1986.414** (♀ LV: Pl. **14**, 10, fig. 2), **1986.415** (♂ LV: Pl. **14**, 10, fig. 3), **1986.416** (♀ car.: Pl. **14**, 12, fig. 1), **1986.417** (♀ LV: Pl. **14**, 12, fig. 2), **1986.418** (♀ RV: Pl. **14**, 12, fig. 3). All Recent, collected from the littoral of Jiangsu Province, China; approx. lat. 34° 17′N, long. 120° 17′E.

Diagnosis: Subovate in lateral view with vertical truncated posterior margin, surface smooth with few very weak reticulae around the margins.

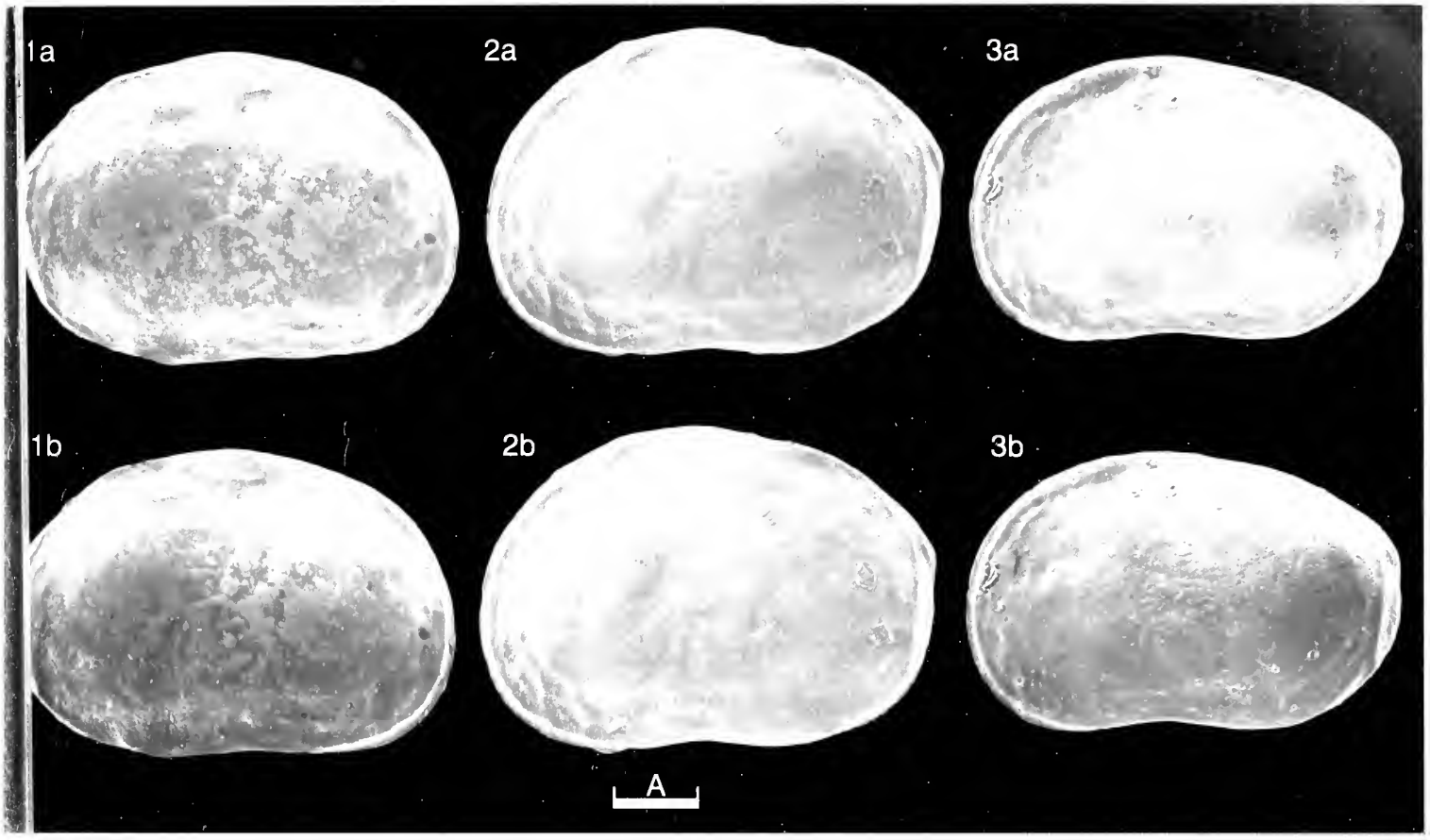
Remarks: Markedly differs from the other two species in this genus. *A. sheyangensis* Chen, 1982 is much more elongate and lower with obliquely truncated posterior margin, and *A. asperata* Guan, 1978 has an ornamentation of coarse reticulation.

Distribution: China, Quaternary to Recent. At the present day this species is abundant and widespread in brackish and nearshore waters along the coast of the East China and Yellow Seas with a salinity range of 3‰ to normal sea water, including marshes, estuaries, littoral and the inner shelf shallower than 50m.

Explanation of Plate 14, 12

Fig. 1, ♀ car., ext. dors. (**1986.416**, 535μm long); fig. 2, ♀ LV, int. lat. (**1986.417**, 515μm long); fig. 3, ♀ RV, int. lat. (**1986.418**, 515μm long).

Scale A (100μm; ×120), figs. 1-3.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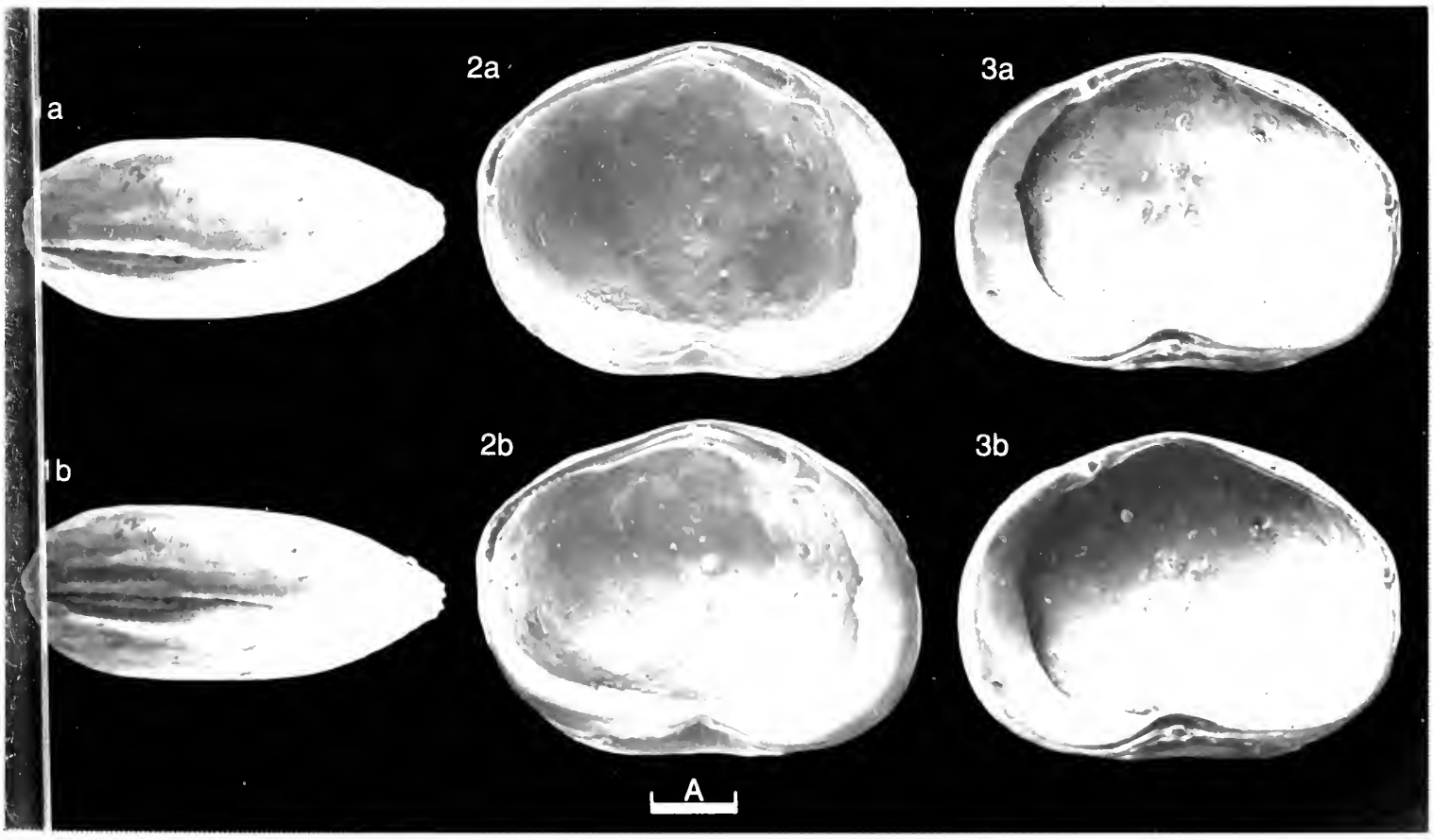
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595.337.14 (118.22 + 119.9) (512.317 + 510 : 161.118.39) : 551.313.1 + 551.35

ON *SINOCYTHERIDEA IMPRESSA* (BRADY)

by Zhao Quanhong & Robin Whatley
(Tongji University, Shanghai, China & University College of Wales, Aberystwyth, UK)

Genus SINOCYTHERIDEA Hou, 1978

Type-species (by subsequent designation) : *S. latiovata* Hou & Chen, 1982
(= *Cytheridea impressa* Brady, 1869; see below)

Diagnosis: A genus of Cytherideidae characterized by its modified antimerodont hingement with a conspicuous anti-slip toothlet anteriorly in the left valve, by which it can be readily distinguished from such similar genera as *Cyprideis* Jones, 1857, *Neocyprideis* Apostolescu, 1965 and *Sarsicytheridea* Athersuch, 1982.

Remarks: *Sinocytheridea* was named by Hou in manuscript more than 20 years ago but remained unpublished until Guan *et al.* (1978) first applied this name for the genus in a published work, attributing the genus to Hou and using Hou's original description. *S. latiovata* Hou & Chen, 1982 was designated by Hou and Chen *in* Hou *et al.* (1982) as the type-species of *Sinocytheridea*. The present authors, however, have recently studied Brady's material from Hong Kong which is deposited in the Hancock Museum and consider *S. latiovata* and *Cytheridea impressa Brady*, 1869 to be conspecific. We therefore consider *C. impressa* to be the type-species of *Sinocytheridea*.

Explanation of Plate 14, 14

Figs. 1, ♀ car., rt. ext. lat (paralectotype, **1.23.44,** 740 μm long); fig. 2, ♀ LV, ext. lat. (**1986.419,** 720 μm long); fig. 3, ♀ car., ext. dors. (**1986.421,** 750 μm long).
Scale A (100 μm; × 85), figs. 1-3.

Sinocytheridea impressa (Brady, 1869)

1869 *Cytheridea impressa* sp. nov. G.S. Brady *in* L. De Folin and L. Perier (eds.), *Les Fonds de la Mer.*, 158, pl. 16, figs. 13, 14.
1978 *Cyprideis yelii* Hu & Yeh, *Geol. Soc., China (Taiwan), Proc.*, **21,** 157-159, text-fig. 5, pl. 3, figs. 10-13.
1978 *Sinocytheridea sinensis* Hou; Hou *in* Guan *et al.*, *Paleontological Atlas Central & S China (4): Ostracoda,* 240, pl. 65, figs. 1-5.
1982 *Sinocytheridea latiovata* sp. nov. Hou & Chen *in* Hou *et al.*, *Cretaceous-Quaternary ostracode fauna from Jiangsu,* 164-165, text-figs. 26a-c, pl. 72, figs. 10-20.
1982 *Sinocytheridea longa* Hou & Chen, *ibid.* 165-166, text-figs. 27a-c, pl. 72, figs. 1-9.

Lectotype: Hancock Museum, Newcastle-upon-Tyne, England, no. **1.24.37,** ♀ LV.
[*Paralectotypes:* Hancock Mus., nos. **1.24.38,** ♀ RV; **1.23.44,** ♀ car.]

Type locality: Hong Kong Harbour; Recent.

Figured specimens: Hancock Museum, Newcastle-upon-Tyne, England, nos. **1.24.37** (lectotype, ♀ LV: Pl. **14**, 16, fig. 2), **1.24.38** (paralectotype, ♀ RV: Pl. **14**, 16, fig. 3), **1.23.44** (paralectotype, ♀ car.: Pl. **14**, 14, fig. 1), Brit. Mus. (Nat. Hist.) nos. **1986.419** (♀ LV: Pl. **14**, 14, fig. 2), **1986.421** (♀ **car.: Pl. 14**, 14, fig. 3), **1986.420** (♂ LV: Pl. **14**, 16, fig. 1). Nos. **1.23.44, 1.24.37** and **1.24.38** belong to the Brady Collection in the Hancock Museum and are from the type-locality; nos. **1986.419-431** are from the Pohai Bya, China, lat. 39° 50′N, long. 118° 46′E, water depth: 15m.

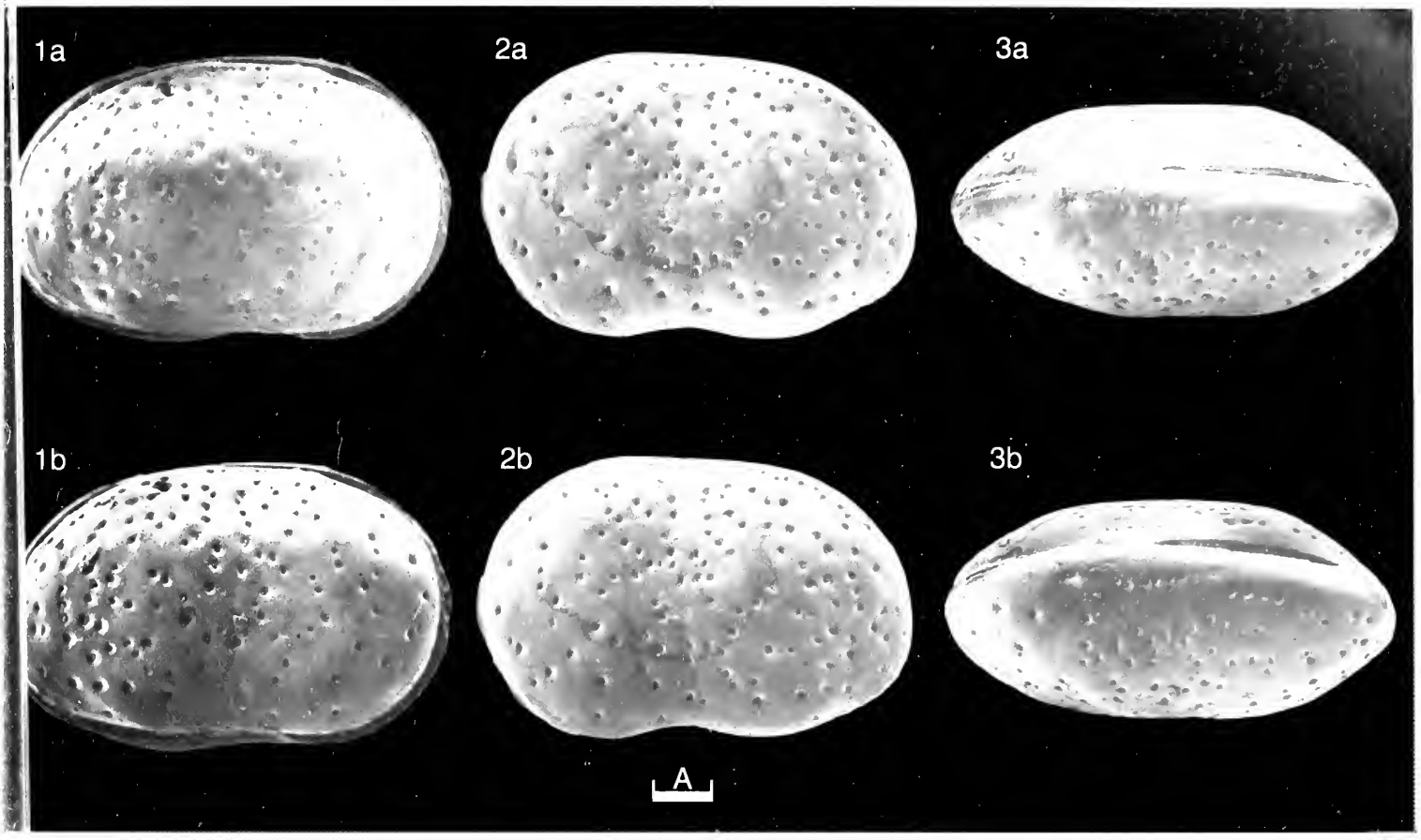
Diagnosis: Elongate-oval without obvious trace of angle in lateral view. RV larger than and slightly overlapping LV along the periphery except anterior margin. Surface smooth with rounded shallow pits (openings of sieve-type normal pore canals). Avestibulate, radial pore canals few, simple. Adductor muscle scar a vertical row of four elongate scars; frontal scar V-shaped.

Remarks: Apart from the more elongate outline, *S. longa* Hou & Chen is identical in carapace features to *S. impressa.* The authors believe that the former species is based on males of *S. impressa.*

Distribution: Pliocene to Recent, China. The modern representatives occur widely in shelf, littoral, estuaries, marshes, tidal pools and channels of the supralittoral zone along the entire coast of China with a salinity distribution ranging from about 2‰ to normal sea water and a water depth ranging from middle shelf (50-100m) to supralittoral.

Explanation of Plate 14, 16

Fig. 1, ♂ LV, ext. lat. (**1986.420,** 660 μm long); fig. 2, ♀ LV, int. lat. (lectotype, **1.24.37,** 775 μm long); fig. 3, ♀ RV, int. lat. (paralectotype, **1.24.38,** 740 μm long). Scale A (100 μm; × 85), figs. 1-3.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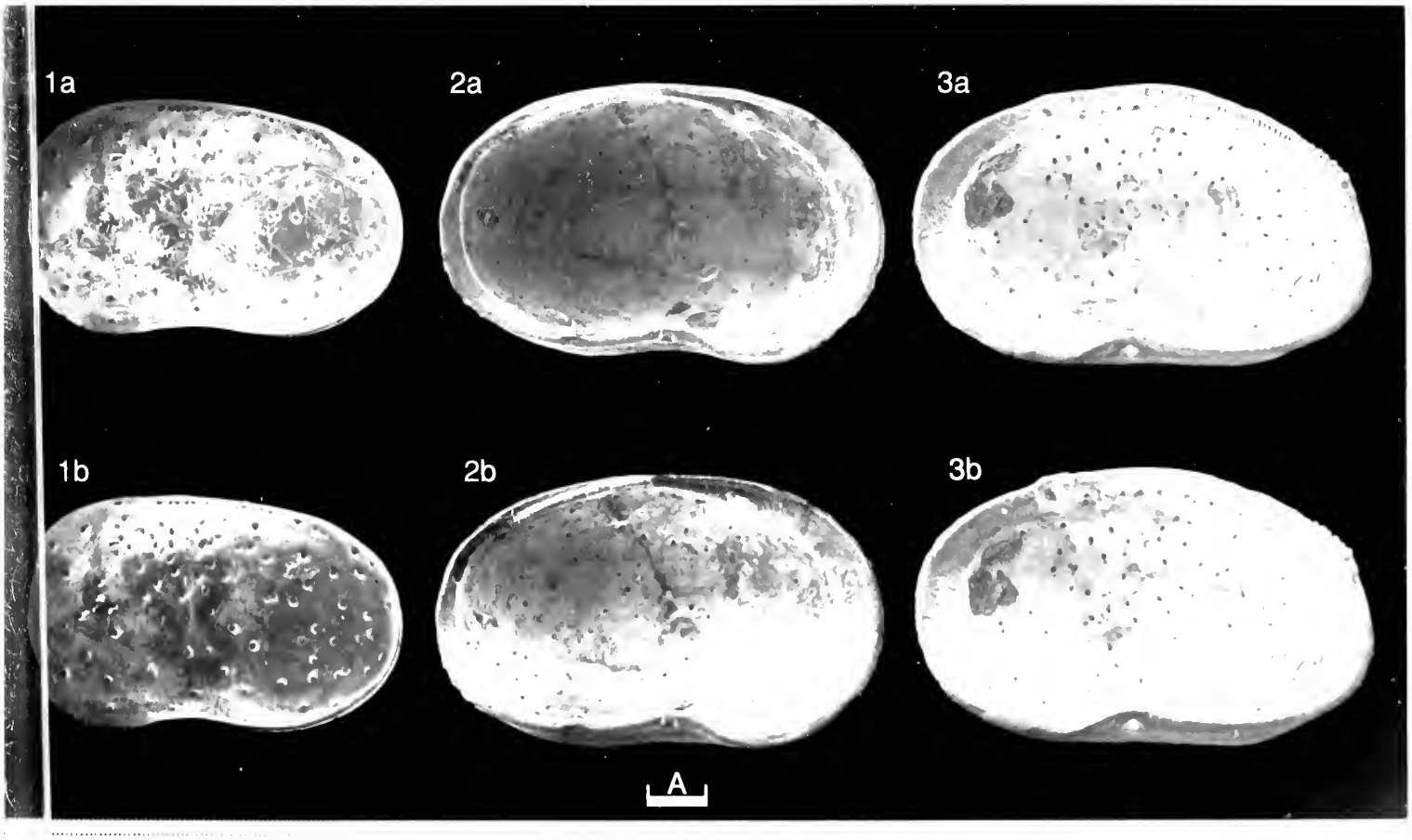
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595.337.14 (118.22) (798 : 162.153.70) : 551.351 + 552.52

ON *PTERYGOCYTHEREIS VANNIEUWENHUISEI* BROUWERS sp. nov.

by Elisabeth M. Brouwers
(U.S. Geological Survey, Denver)

Pterygocythereis vannieuwenhuisei sp. nov.

1986 *Pterygocythereis* sp. nov. C. A. Repenning, E. M. Brouwers, *et al.*, *Bull. U.S. Geol. Surv.*, **1687**, pl. 1, fig. 1.

Holotype: U.S. National Museum no. **410130**, ♂ RV.
[Paratypes: U.S. National Museum nos. **410131-410134**].

Type locality: Cutbank on a tributary of the Kalikpik River, Arctic coastal plain, North Slope, Alaska (lat. 70° 26.7′N, long. 152° 09.4′W); Pliocene. Outcrop consists of 1.8m of late Pliocene marine clay and sand overlain by 5.5m of Pleistocene fluvial and eolian sands. Deeper inner sublittoral to middle sublittoral water depths; cold temperate to subfrigid marine climate.

Derivation of name: In honour of Don Van Nieuwenhuise, research geologist at Amoco Production, Houston.

Figured specimens: U.S. National Museum nos. **410130** (holotype, ♂ RV: Text-fig. 1), **410131** (paratype, ♀ LV: Pl. **14**, 18, fig. 1), **410132** (paratype, ♂ RV: Pl. **14**, 18, fig. 2), **410133** (paratype, ♂ LV: Pl. **14**, 20, fig. 1), **410134** (paratype, LV: Pl. **14**, 20, fig. 2). All from the type locality and horizon (locality 83-EB-187, 188, collected by E. Brouwers, 1983).

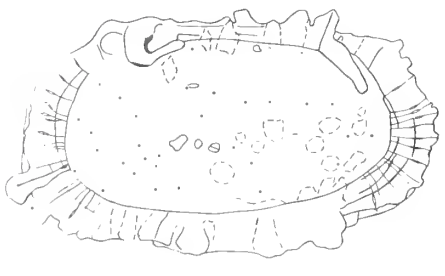
Diagnosis: Short, high, rectangular lateral outline; large size; weak dimorphism. Three pairs of spines in median valve area; large, strong marginal spines. Wide marginal flange, continuous along anterior and venter. Numerous ventral marginal spines. Spinose anterodorsal margin with weak underlying flange. Strong posteroventral spinose prolongation. Left valve hinge has anterior socket with ventral rim; elongate, U-shaped posterior socket; cylindrical posteromedian tooth; weakly crenulate median bar.

Explanation of Plate 14, 18

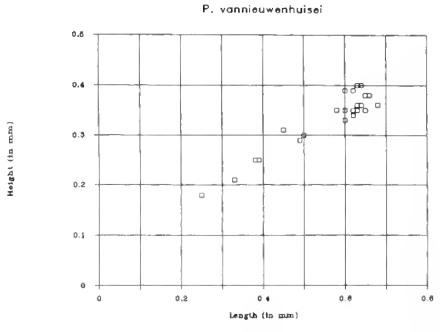
Fig. 1, ♀ LV, ext. lat. (paratype, **410131**, 1380μm long); fig. 2, ♂ RV, ext. lat. (paratype, **410132**, 1460μm long). Scale A (100μm; ×125), figs. 1, 2.

Remarks: *Pterygocythereis* ranges from the Paleocene-Holocene, occurring commonly throughout the subtropical and temperate N Atlantic Ocean and rarely in the subfrigid Norwegian Sea. In the northwestern Atlantic Ocean, *Pterygocythereis* occurs in the southern cold temperate zone, but does not live in the northern cold temperate or subfrigid zones of the western N Atlantic. *Pterygocythereis vannieuwenhuisei* is related to the European *P. mucronata-P. jonesii* species complex and not to the more temperate NW Atlantic *P. americana-P. inexpectata* lineage.

Distribution: ?Late Miocene, early-late Pliocene (to 2.48 Ma): NE Alaska, three localities in Colvillian-aged sediments of the Gubik Fm. (Fish Creek, Kalikpik R., Miluveach Creek; 2.48 – 3.0 Ma, late Pliocene; Repenning *et al.*, *op. cit.*), three localities in the upper Nuwok Member of the Sagavanirktok Fm. (Carter Creek, Barter Is., Manning Pt.; ?late Miocene, lower to middle Pliocene).



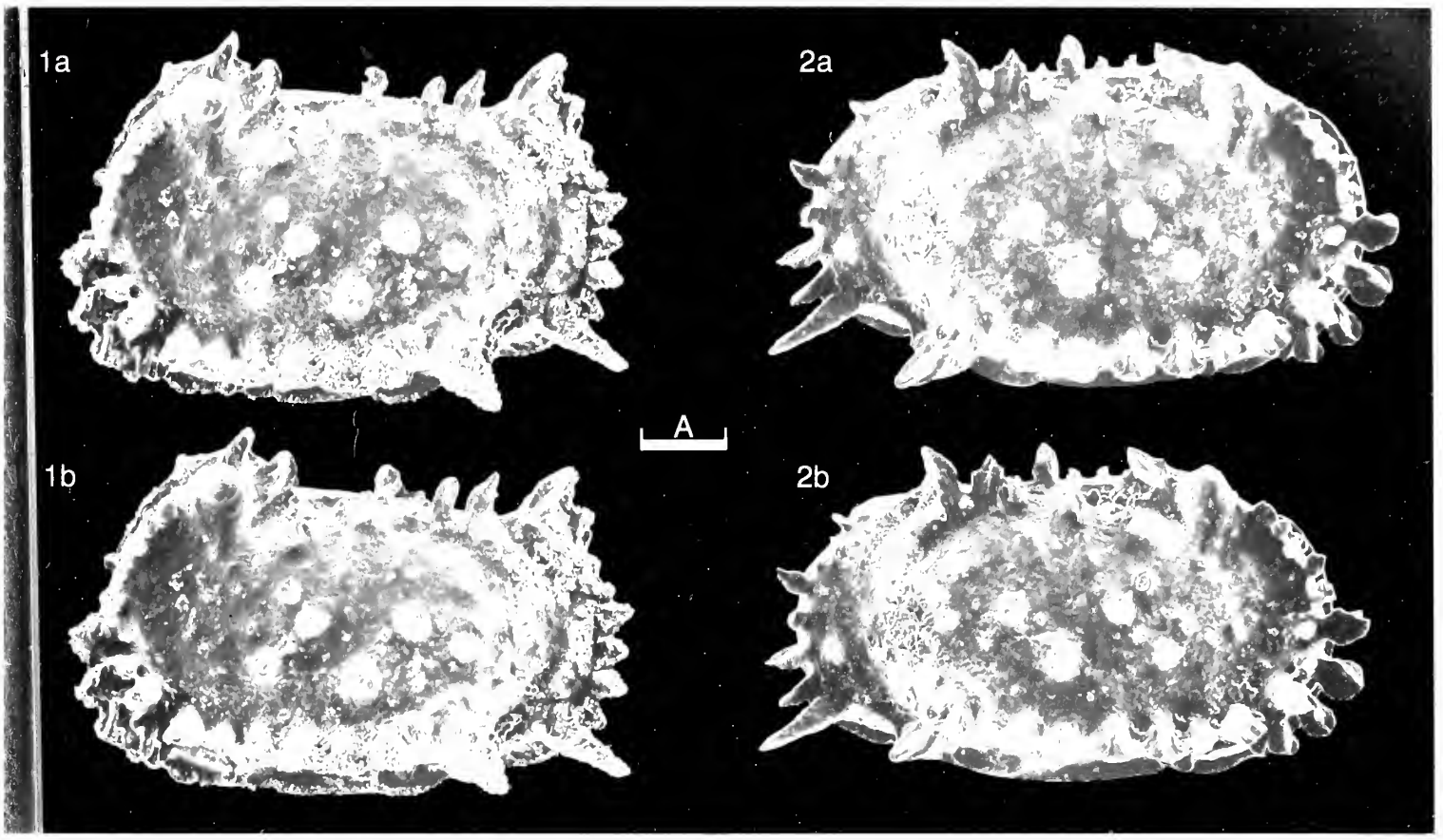
Text-fig. 1. Holotype (♂ RV, USNM no. **410130**), camera lucida drawing, seen in transmitted light.



Text-fig. 2. Plot of length vs. height for 26 specimens from the type locality.

Explanation of Plate 14, 20

Fig. 1, ♂ LV, ext. lat. (paratype, **410133**, 1280μm long); fig. 2, LV, int. lat. (paratype, **410134**, 1300μm long). Scale A (100μm; ×125), figs. 1, 2.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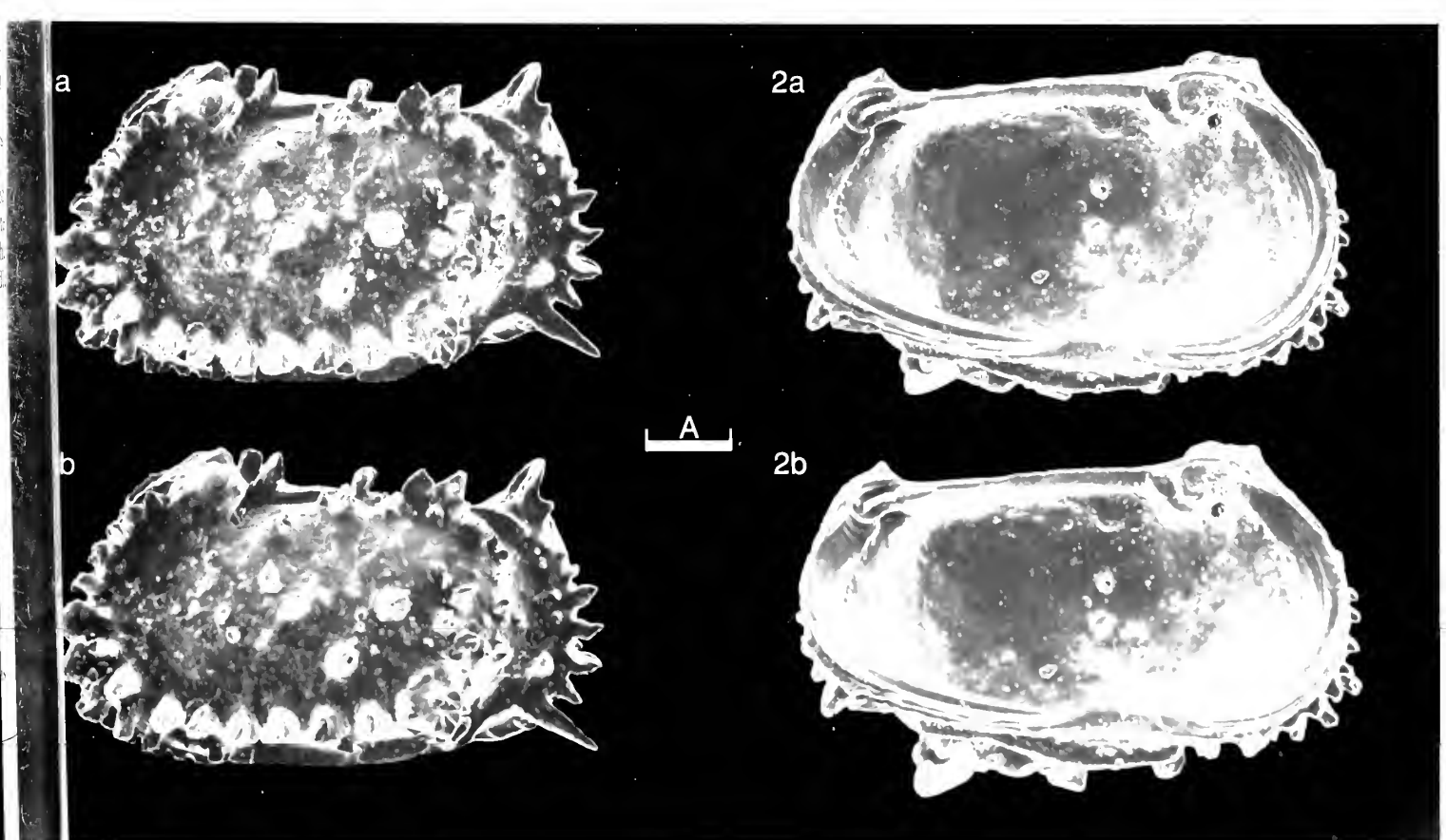

a
2a
A
b
2b

595.337.14 (119.1/119.9) (261.4 : 162.082.24) : 551.351/352

ON *MUELLERINA HAZELI* COLES & CRONIN sp. nov.

by Graham P. Coles & Thomas M. Cronin
(University College of Wales, Aberystwyth & U.S. Geological Survey, Reston, Virginia)

Muellerina hazeli sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12971**, ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12972-OS 12975**. Four additional paratypes have been deposited in the U.S. Museum of Natural History: USNM nos. **409239-409242**].

Type locality: Off the Florida Keys, United States continental slope; approx. lat. 24° 26′N, long. 81° 38′W; Recent, water depth 107m.

Derivation of name: In honour of Joseph E. Hazel, in recognition of his studies on *Muellerina* from the Atlantic Coastal Plain and shelf.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12971** (holotype, ♀ LV: Pl. **14**, 22, fig. 1; Pl. **14**, 24, fig. 1), **OS 12972** (paratype, ♀ RV: Pl. **14**, 22, fig. 2), **OS 12973** (paratype, ♂ LV: Pl. **14**, 22, fig. 3), **OS 12974** (paratype, ♂ RV: Pl. **14**, 24, fig. 2), **OS 12975** (paratype, ♂ car.: Pl. **14**, 24, fig. 3). All from the type locality and horizon.

Explanation of Plate 14, 22

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12971**, 580μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12972**, 570μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12973**, 550μm long).
Scale A (100μm; ×130), figs. 1-3.

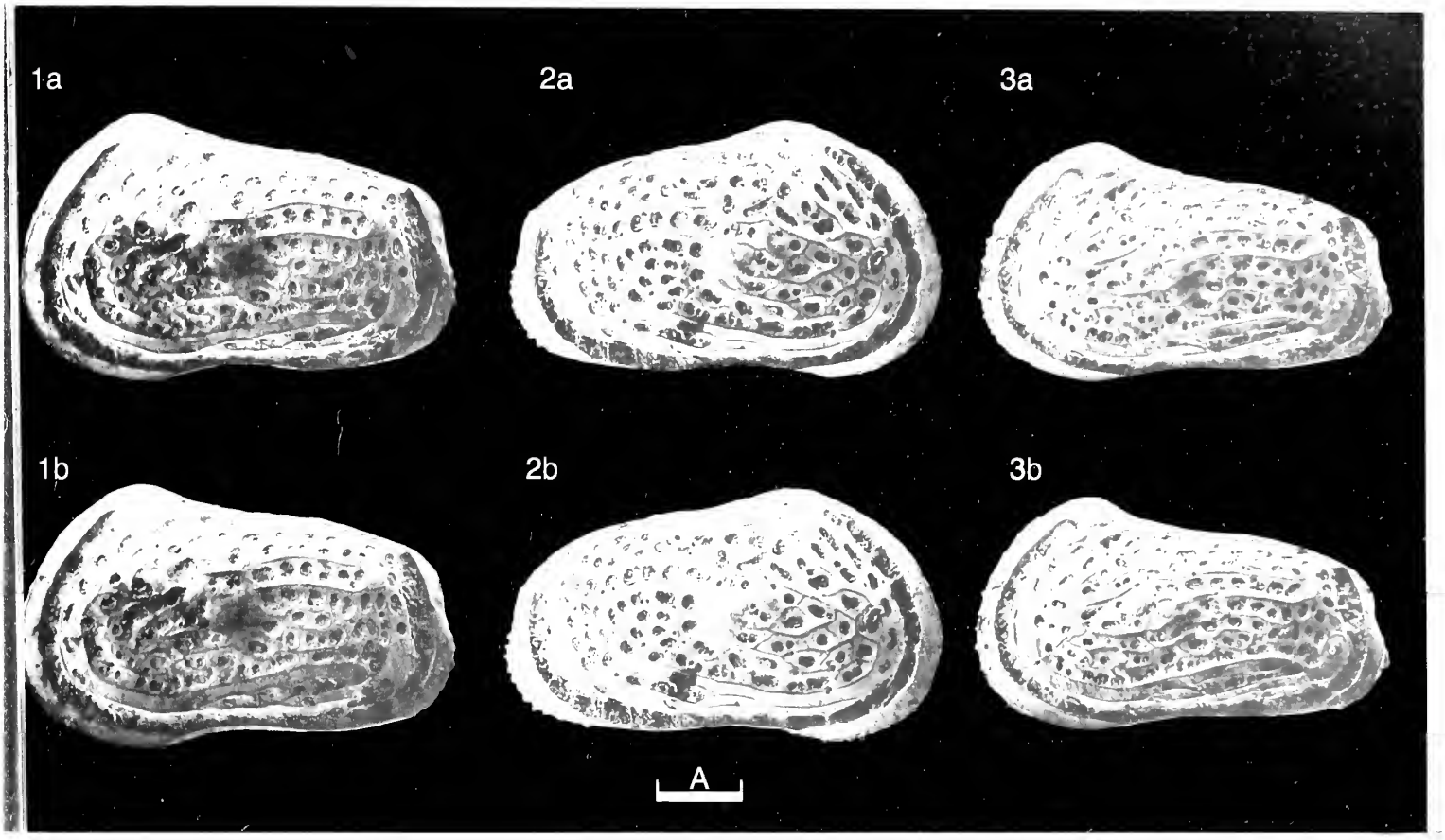
Diagnosis: A species of *Muellerina* characterised by small size, relatively thick shell, simple subovate outline in dorsal view, and delicate ornament consisting of numerous discrete circular to ovate fossae with several sharply defined narrow muri extending both above and below the muscle scar platform and into the anterior field of the valve.

Remarks: *M. hazeli* most closely resembles *M. ohmerti* Hazel, 1983, but is distinctly smaller, being equivalent in size to the A-1 instar of *M. ohmerti*, and has a distinctive, more delicately developed ornament. *M. hazeli* rarely occurs sympatrically with *M. ohmerti* north of Cape Hatteras (above 35°N), but is more abundant in deeper water on the upper continental slope, whereas *M. ohmerti* is a typical shelf species, most common at depths between 25 and 175m (Hazel 1970). *M. hazeli* is both the smallest and the most southerly distributed extant species of *Muellerina*. It is believed to have evolved from its parent species, *M. ohmerti*, during a high sea level stand in the late Pliocene (Cronin & Coles, in prep.), and has since undergone little morphological change.

Distribution: Recent of the Atlantic continental shelf and slope from the Florida Keys (24° 25′N) to off New York at the head of Lydonia Canyon (40° 30′N). *M. hazeli* lives on the outer shelf and upper slope, most commonly between 75 and 250m, having a maximum present-day depth range of 35 to 382m. It is also present in Pleistocene sediments in cores off the eastern United States from 32° 04′N to 38° 22′N, and in Pleistocene outcrops in the Norfolk and Wilmington submarine canyons.

Explanation of Plate 14, 24

Fig. 1, ♀ LV, int. lat. (holotype, **OS 12971**, 580μm long); fig. 2, ♂ RV, int. lat. (paratype, **OS 12974**, 530μm long); fig. 3, ♂ car., dorsal (paratype, **OS 12975**, 570μm long).
Scale A (100μm; ×130), figs. 1-3.


1a
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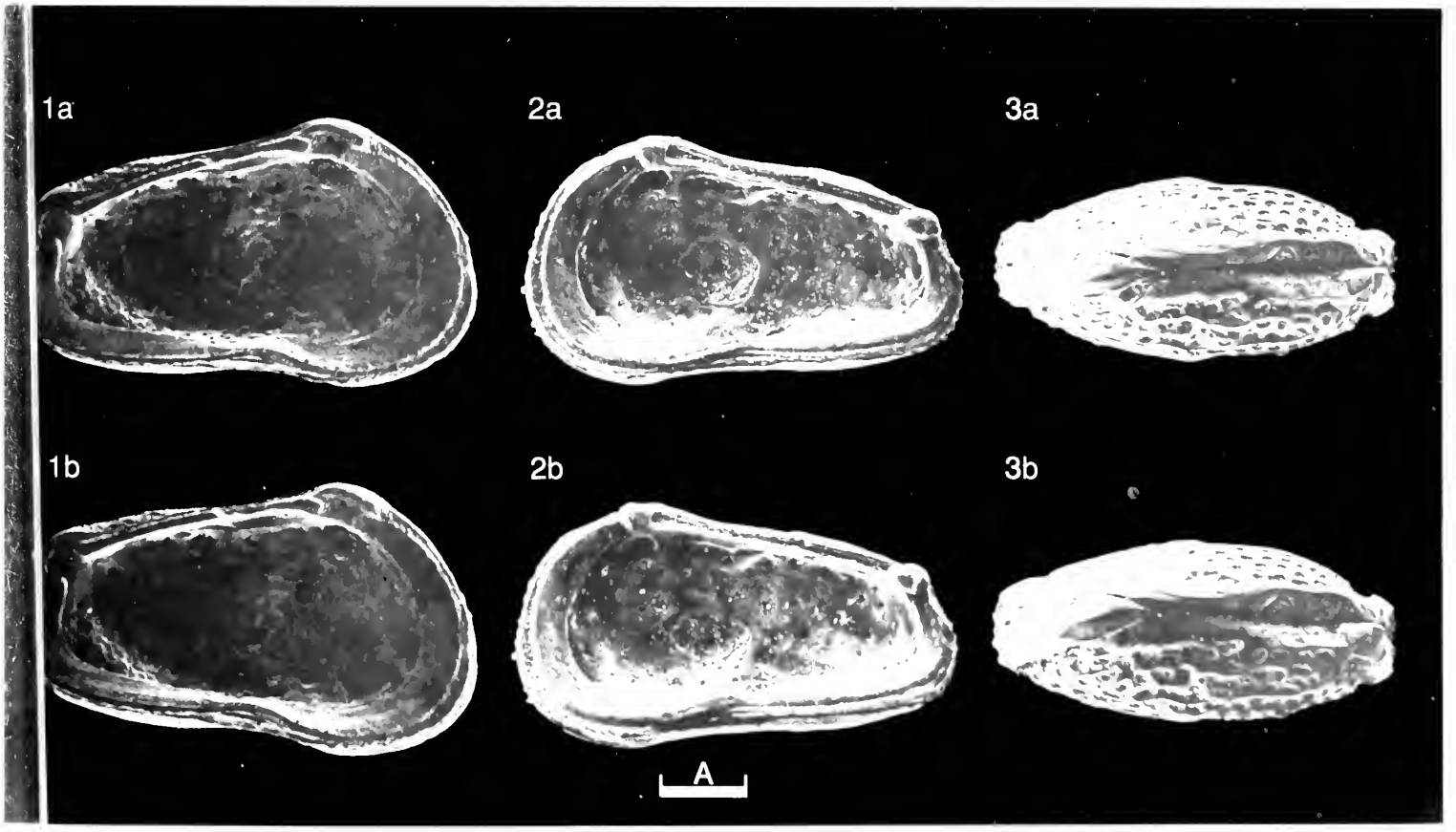
3a
1b
2b
3b
A


1a
2a
3a
1b
2b
3b
A

595.337.21 (113.51) (44 : 161.002.47) : 551.351 + 552.54

ON *HEALDIANELLA ? AREMORICA* CRASQUIN sp. nov.

by Sylvie Crasquin
(University of Lille, France)

Healdianella ? aremorica sp. nov.

Holotype: University of Lille; France, ostracode Collection (**COUL**) no. **860**, ♂ carapace. [Paratypes: **COUL** nos. **861**, **862**, **863**, **865**, **2155**].

Type locality: Port Etroit Quarry (sample no. 85 MA 1), Laval syncline, Armorican Massif, France; lat. 47° 50′ 54″ N, long. 2° 39′ 02″E. Sablé Limestone, uppermost Tournaisian, Carboniferous.

Derivation of name: From the latin *aremoricus*, Armorica, western province of Gaul.

Figured specimens: University of Lille, France, ostracode collection (**COUL**) nos. **860** (holotype, ♂ car.: Pl. **14**, 26, fig. 1), **862** (♀ car.: Pl. **14**, 26, fig. 2), **863** (♀ car.: Pl. **14**, 26, fig. 3), **865** (♀ car.: Pl. **14**, 28, fig. 1), **861** (juv. car.: Pl. **14**, 28, fig. 2), **864** (juv. car.: Pl. **14**, 28, fig. 3), **2155** (♂ car.: Pl. **14**, 28, fig. 4). All from the Sable Limestone of type locality; uppermost Tournaisian, lower Carboniferous.

Explanation of Plate 14, 26

Fig. 1, ♂ car., rt. lat. (holotype, **COUL 860**, 0.58 mm long); fig. 2, ♀ car., rt. lat. (paratype, **COUL 862**, 0.58 mm long); fig. 3, ♀ car., rt. lat. (paratype, **COUL 863**, 0.60 mm long).

Scale A (200 μm; × 140), fig. 1; scale B (200 μm; × 85), figs. 2, 3.

Diagnosis: Small, smooth species (adults 0.52-0.63 mm long) doubtfully assigned to *Healdianella*. Anterodorsal border straight; anterior border with a maximum of convexity located between 1/2 and lower 1/3 of valve height; ventral border is concave, with maximum concavity located in the anterior 1/3 of valve length; posterior border broadly rounded with maximum convexity located slightly below mid-height. In dorsal view, the carapace is laterally compressed in the medial region. Overlap is weak.

Sexual dimorphism: heteromorphs have a more obtuse dorsal angle in lateral view, and in dorsal view are wider behind a more pronounced median stricture. Tecnomorphs have a more acute dorsal angle in lateral view and in dorsal view are virtually of equal width throughout, the median stricture being poorly developed.

Remarks: This species looks like *Healdianella linevensis* Tschigova, 1958 from the upper Tournaisian of the Saratov-Leningrad area (*Trudy V.N.I.G.R.I.*, **14**). *H. linevensis* differs in having a smaller length/height ratio, a more convex anterodorsal border and an anterior border which is not laterally compressed.

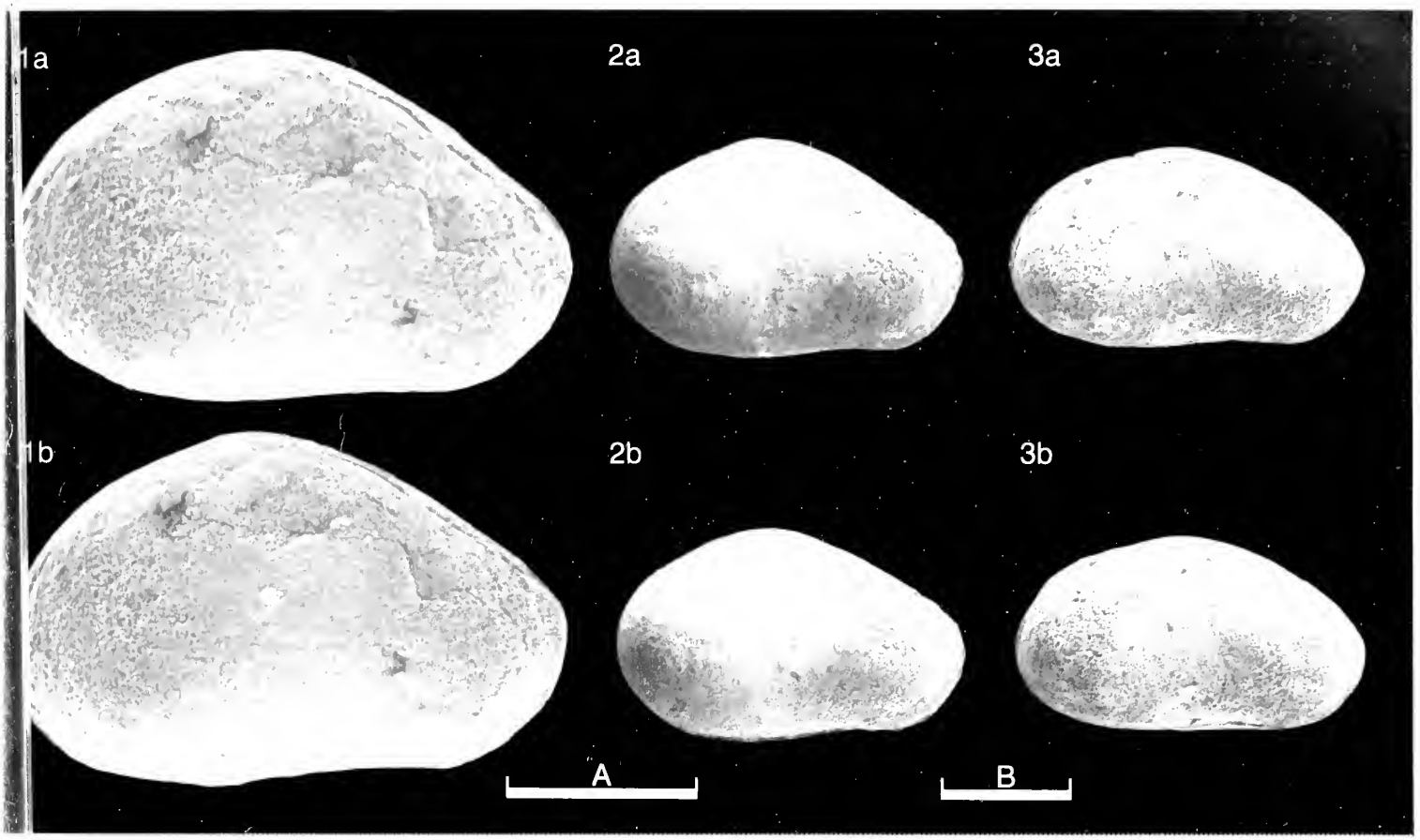
H. ? aremorica is assigned to *Headianella* with doubt because in dorsal view its carapace is laterally compressed in the medial region, a characteristic not observed in other species of that genus.

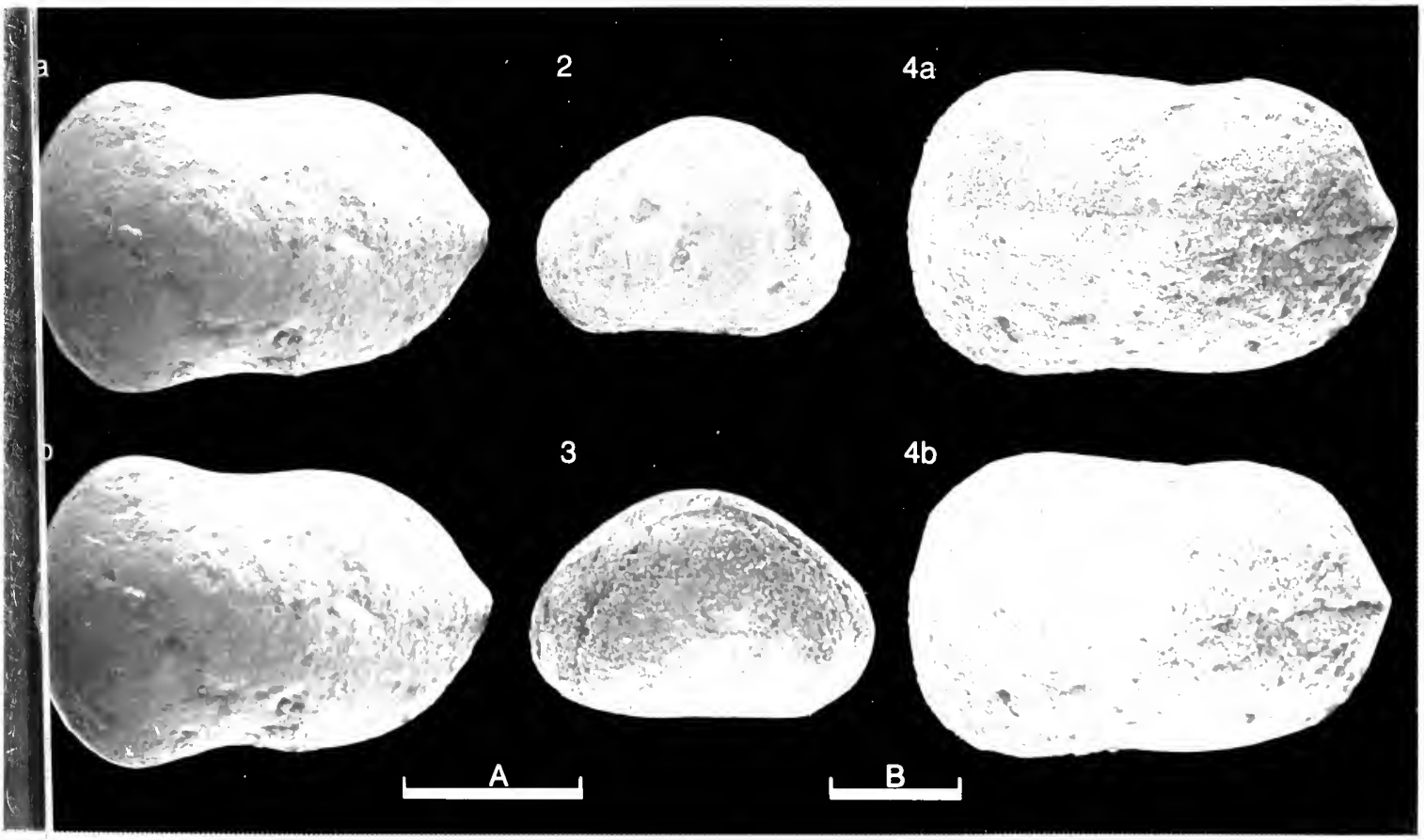
Distribution: Laval syncline, Armorican Massif, France: uppermost Tournaisian-lower Visean, lower Carboniferous.

Explanation of Plage 14, 28

Fig. 1, ♀ car., dors. (paratype, **COUL 865**, 0.58 mm); fig. 2, juv. car., lt. lat. (paratype, **COUL 861**, 0.47 mm long); fig. 3, juv. car., rt. lat. (paratype, **COUL 864**, 0.40 mm long); fig. 4, ♂ car., dors. (paratype, **COUL 2155**, 0.55 mm long).

Scale A (200 μm; × 125), figs. 1, 3, 4; scale B (200 μm; × 100), fig. 2.


1a
2a
3a
1b
2b
3b
A
B


a
2
4a
b
3
4b
A
B

595.337.14 (116.331) (65 : 161.004.35) : 551.35

ON *MAGHREBEIS TUBERCULATA* MAJORAN gen. et sp. nov.

by S. Majoran
(Department of Historical Geology and Palaeontology, University of Uppsala, Sweden)

Genus *MAGHREBEIS* gen. nov.
Type-species: *Maghrebeis tuberculata* sp. nov.

Derivation of name: From the North African province of Maghreb (including Morocco, Algeria and Tunisia).

Diagnosis: Carapace small, subtriangular, inequivalved. Left valve larger, overhanging posterior, ventral and anterior margins of right valve. Ventral margin convex, converging posteriorly with straight dorsal margin. Thick, swollen ridge runs along evenly rounded anterior margin, denticulated prominently only on right valve, seldom and only feebly on left valve. Caudal process triangular, pointed at mid-height and armed with a swollen ridge. Ornament polymorphic. Ventromedian and dorsomedian areas bear pronounced lobate tubercles. Lateral surface variously pitted, ventral surface with 4-5 fine longitudinal ribs. Hinge ear of left valve is large, forms a thick, hook-like protuberance that overlaps right valve. Circular eye tubercle and ovate adductor muscle tubercle prominent. Hinge amphidont/heterodont; right valve has large posterior tooth and strong anterior tooth with a large, spherical distal part fused to a smaller proximal part.

Remarks: Similar outline to *Veenia* Butler & Jones, 1957 and *Veeniacythereis* Gründel, 1973, which differ by being larger, having 3 longitudinal ridges and lacking the curved, left hinge ear of *Maghrebeis*. The left hinges of all three are similar, but the right hinge of *Maghrebeis* differs in having a modified anterior tooth. *Veenia* also differs by its usually more pointed caudal process, and *Veeniacythereis* by its feeble or absent subcentral tubercle.

Cythereis? sp. of Rosenfeld & Raab (*Bull. geol. Surv. Israel*, **62**, pl. 2, figs. 45-46, 1974; upper Cenomanian, Israel) probably belongs to *Maghrebeis* since it differs only by its smooth

Explanation of Plate 14, 30

Fig. 1, ♀?car., lt. lat. (holotype, **PMAL1**, 500μm long); fig. 2, ♀? car., dors., (**PMAL2**, 530μm long); fig. 3, ♀? RV, int. lat. (**PMAL3**, 500μm long); fig. 4, ♀? LV, int. lat., (**PMAL4**, 510μm long). Scale A (100μm; ×130), figs. 1-4.

Remarks: (cont.) surface and possibly having one less dorsal tubercle. Also possibly congeneric is *Cythereis lindiensis* Bate, 1969 as reported by Grosdidier (*Revue Inst. fr. Petrole.*, **28**, pl. 13, fig. 104, 1973), which appears to be slightly larger and has more irregular dorsomedian and ventromedian tuberculation, a less pronounced subcentral tubercle and a smooth surface. Further differences are revealed by the original description and re-illustrated type material of *C. lindiensis* (Bate & Mellish, *Stereo-Atlas Ostracod Shells*, **13**, 59-62, 1986). Another externally similar, considerably larger species is Grosdidier's *Cythereis gr. malzi* Bischoff, 1963 (*Revue Inst. fr. Petrole*, **28**, pl. 14, fig. 105, 1973).

Maghrebeis tuberculata sp. nov.

Holotype: Palaeontological Museum, University of Uppsala, Sweden, no. **PMAL1**, ♀? carapace.

Type locality: Approx. 14km SW of Tocqueville, Algeria (approx. lat. 35° 52′N, long. 4° 55′E); Cenomanian.

Derivation of name: Latin, from the prominent dorsomedian and ventromedian tubercles.

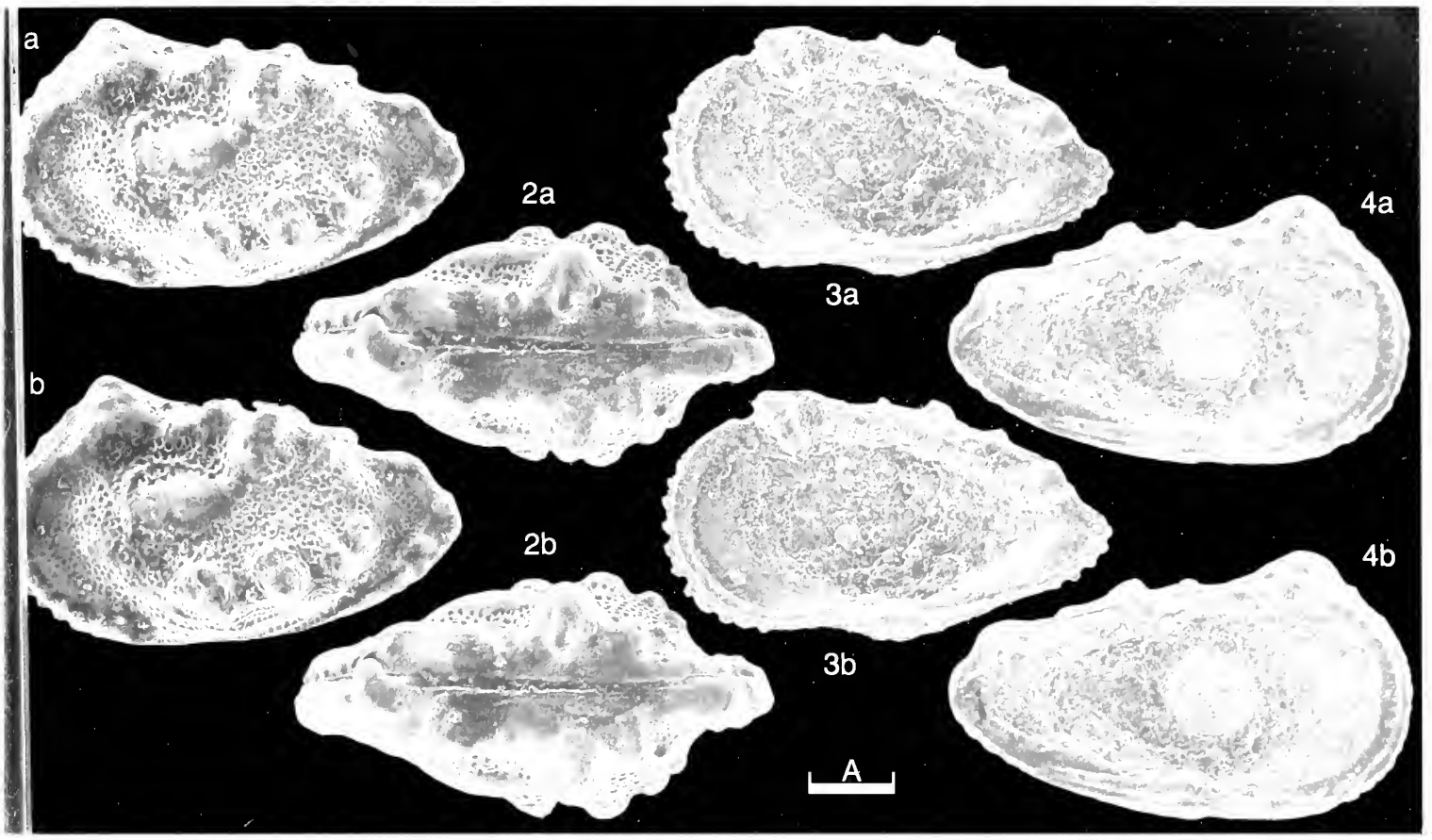
Figured specimens: Palaeontological Museum, University of Uppsala, Sweden, nos. **PMAL1** (holotype, ♀? car.: Pl. **14**, 30, fig. 1), **PMAL2** (♀? car.: Pl. **14**, 30, fig. 2), **PMAL3** (♀? RV: Pl. **14**, 30, fig. 3), **PMAL4** (♀? LV: Pl. **14**, 30, fig. 4), **PMAL5** (♀? car.: Pl. **14**, 32, fig. 2), **PMAL6** (♀? car.: Pl. **14**, 32, fig. 1), **PMAL7** (♂? car.: Pl. **14**, 32, figs. 3, 4). All from the type locality and horizon.

Diagnosis: *Maghrebeis* with fine network of small pits, and 3 smooth, lobe-like tubercles respectively on dorsomedian and ventromedian regions. Two additional, smaller tubercles vertically arranged on posteromedian area. Swollen anterior and posterior ridges, pronounced eye tubercle, and ovate, adductor muscle tubercle are all smooth as are also some narrow, longitudinal fields on ventral surface. Ornament polymorphic with respect to size and configuration of dorsomedian and ventromedian tubercles, strength of anterior and posterior ridges, and presence of denticles along ventral section of caudal process. Shape differences might reflect sexual dimorphism: one type being dorsoventrally and laterally more compressed (= ♂?).

Distribution: Uppermost Albian (or lower Cenomanian) to middle Cenomanian of N Africa.

Explanation of Plate 14, 32

Fig. 1, ♀? car., rt. lat. (**PMAL 6**, 500μm long); fig. 2, ♀? car., vent., showing pitted surface with smooth, narrow, longitudinal fields (**PMAL5**, 500μm long); figs. 3-4, ♂? car. (compressed morph), (**PMAL7**, 500μm long): fig. 3, car., rt. lat.; fig. 4, detail of dorsomedian tuberculation. Scale A (100μm; ×130), figs. 1-3; scale B (100μm; ×280), fig. 4.


a
2a
3a
4a
b
2b
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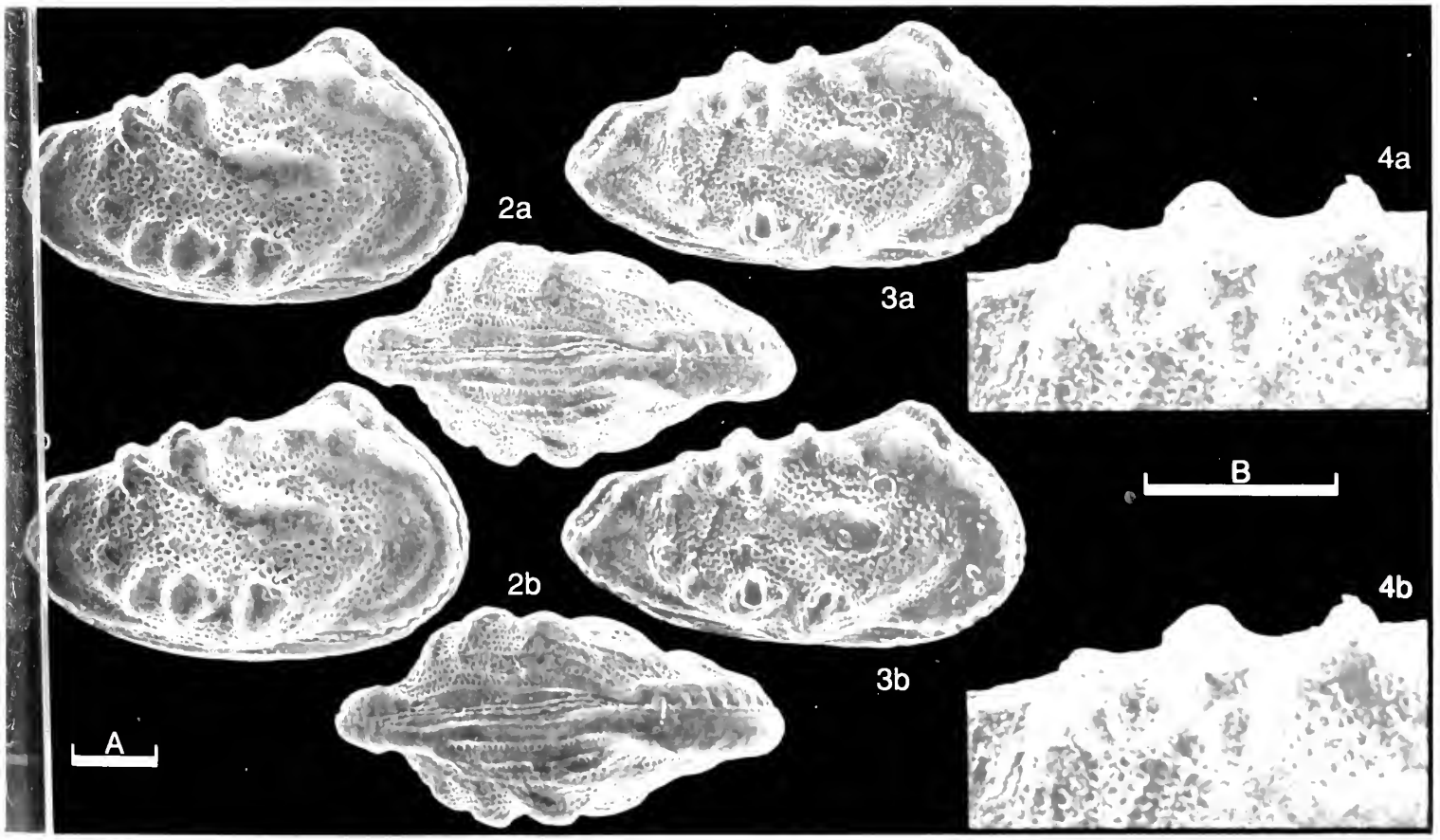
4b
A


2a
3a
4a
B
2b
3b
4b
A

595.337.14 (118.22 + 119.9) (520 : 161.140.41 + 520 : 161.140.42) 551.351

ON *HOWEINA CAMPTOCYTHEROIDEA* HANAI

by Noriyuki Ikeya & Ellen Compton-Gooding
(Shizuoka University, Shizuoka, Japan & U.S. Geological Survey, Reston, VA)

Genus HOWEINA Hanai, 1957

Type-species (by original designation): *Howeina camptocytheroidea* Hanai, 1957

Diagnosis: Ovate Cytheruridae, right valve overlapping on dorsal margin, left valve overlapping on ventral margin. Greatest height anterior, ventral margin nearly straight with a slight alate projection, eye tubercle indistinct. Inner margin has modified S-shape along posterior margin.

Remarks: *Howeina* resembles *Semicytherura* Wagner, 1957 (see Whittaker, *Stereo-Atlas Ostracod Shells,* **2**, 69-92, 1974); some might consider them synonymous since both have S-shaped posterior inner margins, but the validity of this criterion for recognising *Semicytherura* is questionable. In any case, right valves of *Howeina* have a large elongate anterior tooth, a knob-like posterior tooth and a smooth median element; in *Semicytherura* anterior and posterior teeth of the right valve are crenulate or have 2-3 knob-like projections, and the median element is smooth in the center with sockets at its ends.

Howeina camptocytheroidea Hanai, 1957

1957 *Howeina camptocytheroidea* sp. nov. T. Hanai, *J. Fac. Sci. Tokyo Univ., sec. 2,* **11**, 22-23, pl. 3, figs. 4a-c, text-figs. 5a, b.
1961 *Howeina camptocytheroidea* Hanai; T. Hanai, *ibid.*, **13**, 358, text-fig. 2, figs. 5a, b.
1971 *Howeina camptocytheroidea* Hanai; K. Ishizaki, *Tohoku Univ. Sci. Rept., 2nd ser., (Geol.),* **43**, 79-80, pl. 2, fig. 21.
1977 *Howeina camptocytheroidea* Hanai; T. Hanai *et al., Bull. Univ. Mus. Tokyo,* **12**, 56, pl. 3, figs. 1-7.

Explanation of Plate 14, 34

Fig. 1, ♂ LV, ext. lat. (**IGSU-0-122**, 618 μm long); fig. 2, ♂ car., ext. dors. (**IGSU-0-126**, 653 μm long); fig. 3, ♂ RV, ext. lat. (**IGSU-0-123**, 613 μm long); fig. 4, ♀ car., ext. vent. (**IGSU-0-121**, 605 μm long); fig. 5, ♀ RV, ext. lat. (**IGSU-0-124**, 625 μm long). Scale A (100 μm; × 100), figs. 1-5.

Holotype: University Museum, University of Tokyo, Tokyo, Japan, no. **UMUT-CA-2612**, ♀ right valve. [Paratypes: nos. **UMUT-CA-2613-2615**].

Type locality: Upper Pliocene Setana Formation at Kaigarazawa, about 500m W of Nishinosawa, Kuromatsu-nai, Suttsu-gun, Hokkaido (lat. 42° 39′ 37″N, long. 140° 17′ 37″E).

Figured specimens: Institute of Geosciences, Shizuoka University (**IGSU**) nos. **0-121** (♀ car.: Pl. **14,** 34, fig. 4), **0-122** (♂ LV: Pl. **14,** 34, fig. 1), **0-123** (♂ RV: Pl. **14,** 34, fig. 3; Pl. **14,** 36, fig. 7), **0-124** (♀ RV: Pl. **14,** 34, fig. 5; Pl. **14**, 36, figs. 4-6), **0-125** (♀ LV: Pl. **14,** 36, figs. 1-3), **0-126** (♂ car.: Pl. **14,** 34, fig. 2). **0-121** is a Recent specimen from Mutsu Bay, northern Honshū (lat. 41° 20′N, long. 140° 55′E). **0-122-126** are from the type locality; **0-122,123** are disarticulated valves of the same individual.

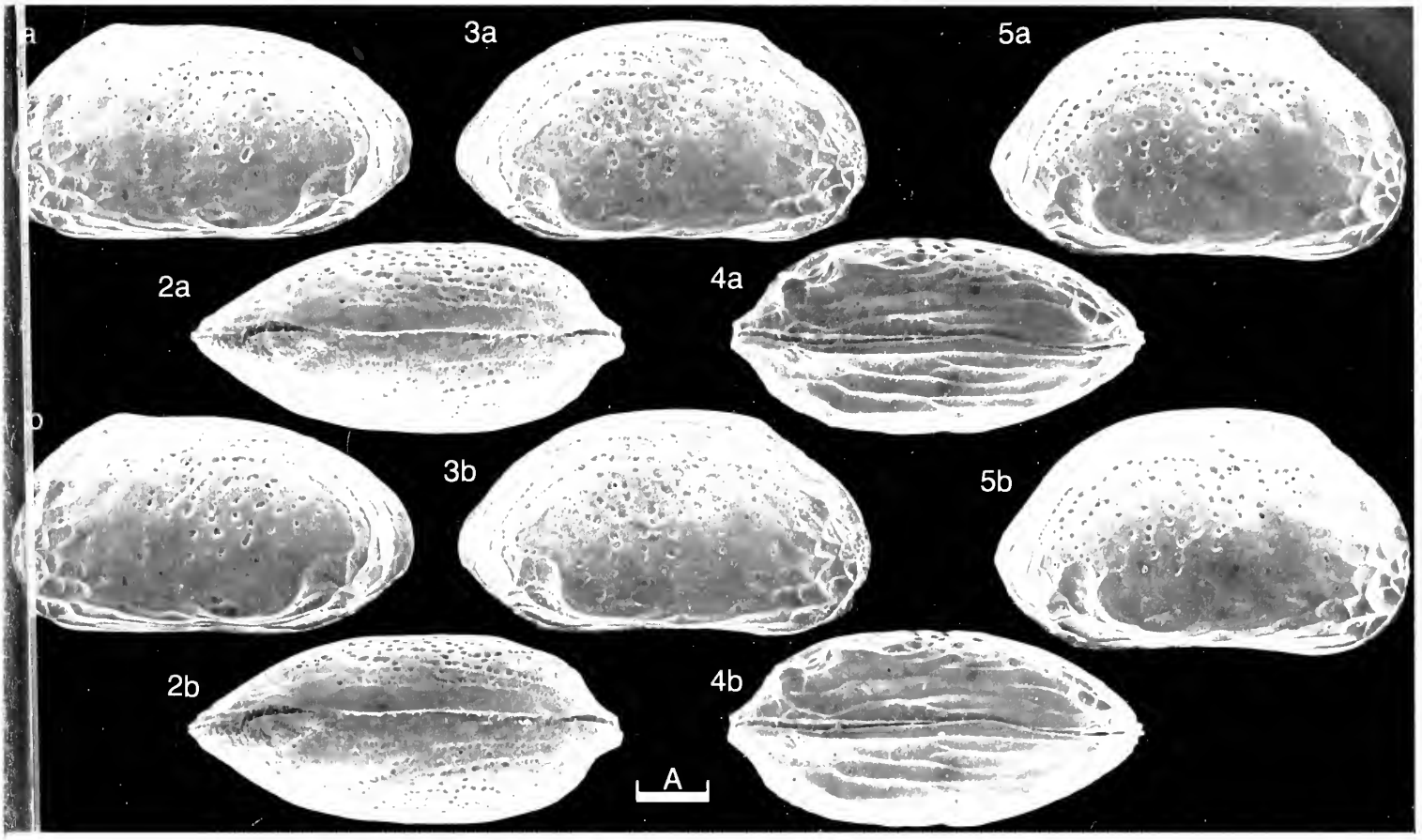
Diagnosis: The valve surface has a pattern of pits that run parallel along the posterior and dorsal margins and somewhat longitudinally in the center of the valve. The anterior and posterior areas have a pattern of irregular polygons delineated by fine ridges. The flat ventral margin has a series of ridges that run parallel to it. The posteroventral area is slightly depressed behind the alate projection.

Remarks: *H. higashimeyaensis* Ishizaki, 1971, *H. leptocytheroidea* (Hanai, 1957), and *H. neoleptocytheroidea* (Ishizaki, 1966) each possess a distinctive pattern of prominent ridges and varying degrees of reticulation. They also have caudal processes that are more obvious than that of *H. camptocytheroidea*. Specimens illustrated by McDougall, Brouwers & Smith (*Bull, U.S. Geol. Surv.*, **1598**, 56, pl. 10, figs. 1,2, 1986) from Prudhoe Bay, Alaska, as *Cytherura* sp. B and *Cytherura* sp. C., appear to be very similar to *H. camptocytheroidea.*

Distribution: A cold water species, *H. camptocytheroidea* is currently living in Suttsu and Uchiura Bays, southern Hokkaido; Aomori and Mutsu Bays, Aomori Prefecture; and Otsuchi Bay, Iwate Prefecture. Late Pleistocene occurrences: the Nopporo Fm. Hokkaido; Shibikawa and Anden formations, Akita Prefecture; Hashidate Fm. Ishikawa Prefecture; and Jizodo, Yabu and Kiyokawa formations in Chiba Prefecture. In the late Pliocene, it occurs at the type locality; the Tomikawa Fm. Hokkaido; the Hamada Fm. Aomori Prefecture; and the Junicho Fm. Toyama Prefecture.

Explanation of Plate 14, 36

Fig. 1-3, ♀ LV (**IGSU-0-125**, 650 μm long): fig. 1, int. lat.; fig. 2, post. hinge; fig. 3, ant. hinge; figs. 4-6, ♀ RV (**IGSU-0-124**): fig. 4, int. lat., fig. 5, ant. hinge; fig. 6, post. hinge; fig. 7, ♂ RV, int. musc. sc., dorsal is to right (**IGSU-0-123**).
Scale A (100 μm; × 100), figs. 1, 4; scale B (100 μm; × 160), figs. 2, 3, 5, 6; scale C (10 μm; × 540), fig. 7.


3a
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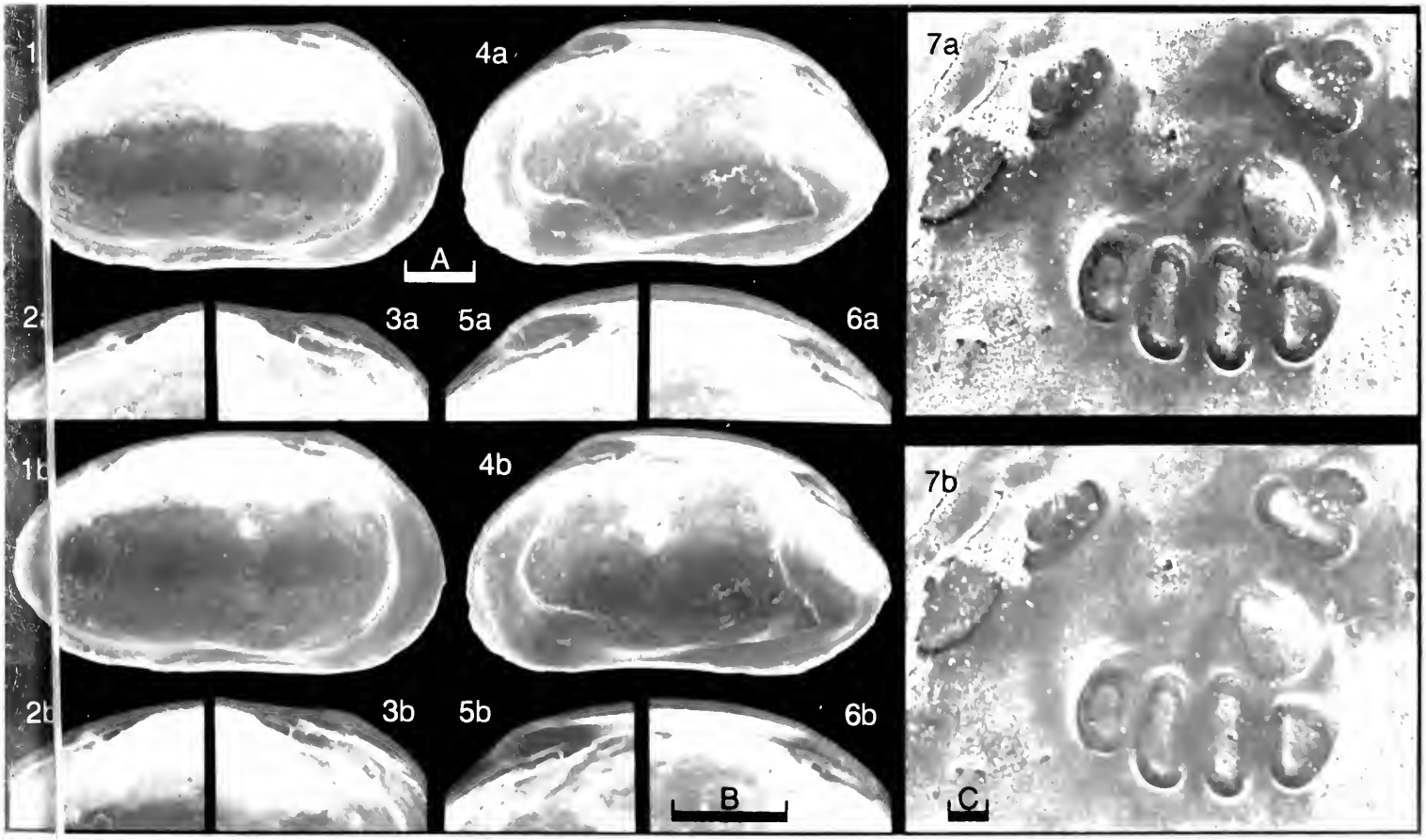
A


4a
A
3a
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6a
4b
3b
5b
6b
B
7a
7b
C

593.337.14 (116.333.3) (492:161.005.50) : 551.35

ON *SPINOLEBERIS EXIMIA* (BOSQUET)

by J. F. Babinot & J. P. Colin
(Université de Provence, Marseille and Esso Production Research-European Lab., Bègles, France)

Genus *SPINOLEBERIS* Deroo, 1966

Type-species: *Cythere eximia* Bosquet, 1854 (by original designation).

Diagnosis: Small-sized trachyleberidid (less than 650 μm) characterized by a well-marked hemispherical, sub-central tubercle; ventral ridge reduced to a strong posterior spinose tubercle and a median lamellar spine; strong spinose tubercle present at the postero-dorsal angle and a vertical spine on the middle part of the dorsal margin. A ridge connects the eye-tubercle and the sub-central tubercle; a weak longitudinal median ridge may be present; anterior margin bordered by two rows of strong spines. Surface of the valves smooth to very finely reticulate mostly on the anterior half. Sexual dimorphism distinct, males being longer than females. Amphidont hinge. Anterior marginal zone of medium width with about 20 straight pore canals. Muscle scars: three small scars disposed in a V-shape or a V-shaped scar with an additional round scar above the posterior branch; four adductor scars, the upper one being divided into two, the one below into three.

Remarks: The genus *Spinoleberis* is relatively common in the late Cretaceous of Western and Central Europe. Typical species are restricted to the Campanian-Maastrichtian. Cenomanian and Turonian species such as *S. petrocorica* (Damotte, *Rev. Micropal*, **14**, 1, 1973), *S. krejcii* Pokorný (*Acta Univ. Carolinae Geol.*, 4, 1968) and *S. ectypus* Babinot (*Géobios*, **6**, 1, 1973) have a rather different morphology; they are deeply reticulate and do not display the characteristic spinose tubercles. Species attributed to the genus *Spinoleberis* by Donze (1970), have been recently placed in the newly erected genus *Navarracythere* Colin & Rodriguez-Lazaro (*Stereo-Atlas Ostracod Shells*, **13**, 63–66, 1986).

Explanation of Plate 14, 38

Fig. 1, ♀ car., ext. rt. lat. (**20648–49**, 560 μm long); fig. 2, ♂ LV, ext. lat. (**20646–47**, 550 μm long); fig. 3, ♂ RV, ext. lat. (**20642–43**, 560 μm long). Scale A (250 μm; ×110), figs. 1–3.

Spinoleberis eximia (Bosquet, 1854)

1854 *Cythere eximia* n. sp. J. Bosquet, *Verhandel. geol. beschr. kaart Nederland*, **2**, 106, pl. 7. figs. 6a–d.
1936 *Cythereis eximia* (Bosquet); J. E. van Veen, *Nat. hist. Maandbl.*, **25**, 11–12, **26**, pl. 7, figs. 1–6.
1958 *Cythereis eximia* (Bosquet); H. Howe & L. Laurencich, *Introduction to the study of Cretaceous Ostracoda*, 196–197.
1966 *Spinoleberis eximia* (Bosquet); G. Deroo, *Meded. geol. Sticht.*, **C**, **2**, 2, 165–166, pl. 6, figs. 72–74, pl. 26, figs. 822–824.
1966 *Cythereis eximia* (Bosquet); E. Herrig, *Paläont. Abh.*, **A**, **2**, 801–802, pl. 18, figs. 1–10, pl. 19, fig. 1.
1983 *Spinoleberis eximia* (Bosquet); B. Clarke, *Mitt. Geol.-Paläont. Inst. Univ. Hamburg*, **54**, 110–111, pl. 7, figs. 11–12.

Holotype: Material deposited in the collections of the Institut Royal des Sciences Naturelles de Belgique, Brussels under the reference "Crétacé Ostracodes 87 Arthr. Sec. I, Cret.", slide no. **44**.

Type locality: Late Maastrichtian of St. Pietersburg, near Maastricht, southern Limburg, the Netherlands.

Figured specimens: These are deposited in the collections of Esso Production Research – European Laboratories at Bègles, France and the numbers all carry the prefix EPR–E. **EPR–E 20648–49** (♀ car.: Pl. **14**, 38, fig. 1), **20646–47** (♂ LV: Pl. **14**, 38, fig. 2), **20642–43** (♂ RV: Pl. **14**, 38, fig. 3), **20650–51** (♀ LV: Pl. **14**, 40, fig. 1), **20654–55** (♂ car.: Pl. **14**, 40, fig. 2), **20816–17** (♀ RV: Pl. **14**, 40, fig. 3). All figured specimens are from Puits Maurits (250.5 m), Maastricht, southern Limburg, The Netherlands; late Maastrichtian.

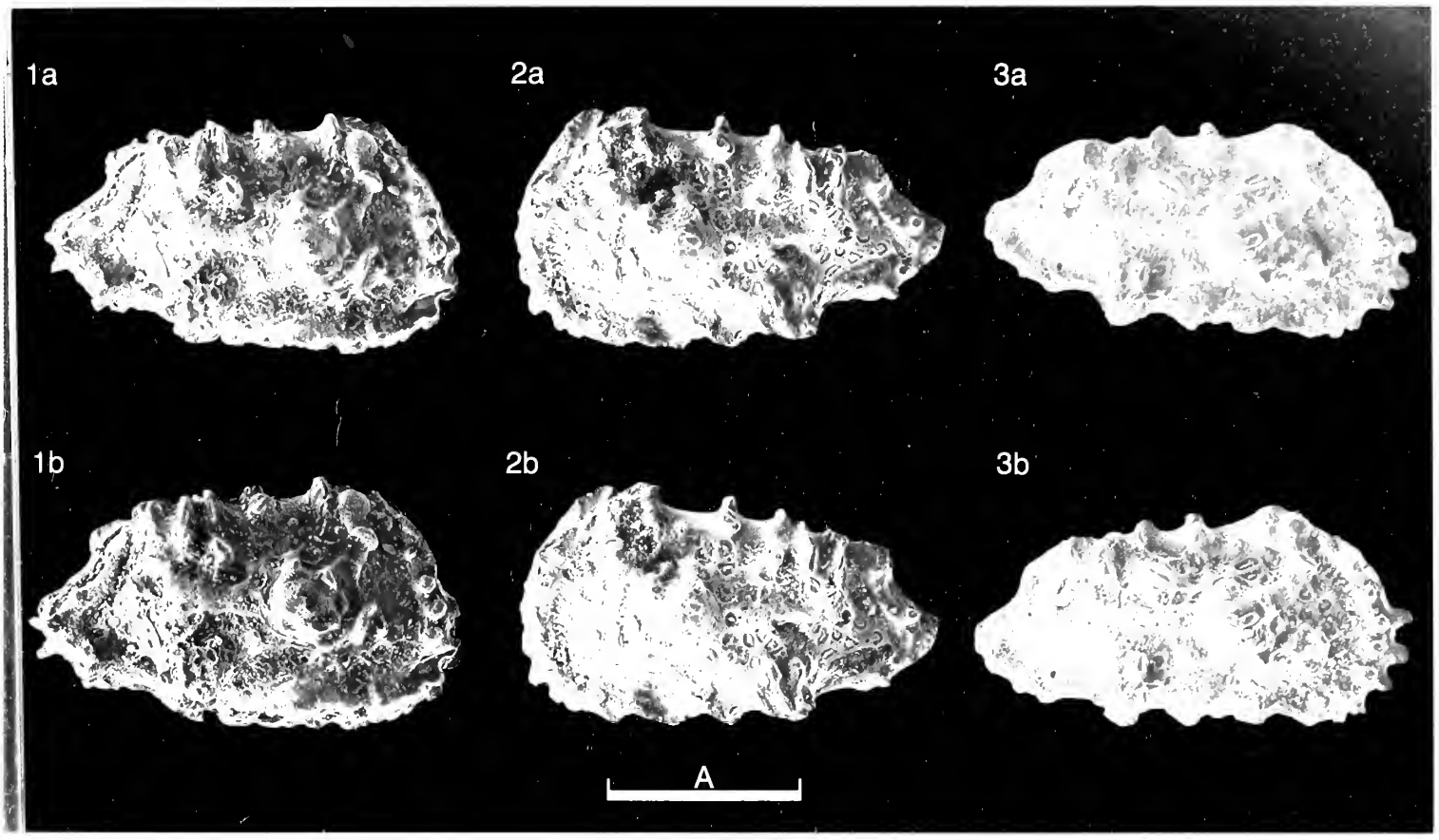
Diagnosis: As for the genus. The surface of the muri of the reticulation is very finely pitted. A little knob occurs in the middle of each mesh.

Remarks: Deroo (1966), illustrated several species of the genus *Spinoleberis* in the type Maastrichtian. Most of the species are very similar to *S. eximia* and therefore extremely difficult to differentiate. Whether they are different species or merely ecotypes is highly questionable. These are *S. eximioides* (van Veen) and *S. pseudoeximia* Deroo. *Cythereis symmetrica* van Veen, 1936 (*Nat. Hist. Maandbl.*, **25**, 11–12) is considered by Deroo (1966) and Clarke (1983) to be a juvenile of *S. eximia*, by Howe & Laurencich (1958), (1965) to belong in *S. tuberosa* (Jones & Hinde) and by Szczechura (1965) to belong in *S. spinifera* (van Veen).

Distribution: Late Maastrichtian of the Netherlands and Belgium. Early to late Maastrichtian of Germany.

Explanation of Plate 14, 40

Fig. 1, ♀ LV, int. lat. (**20650–51**, 575 μm long); fig. 2, ♂ car., ext. dors. (**20654–55**, 555 μm long); fig. 3, ♀ RV, int. lat. (**20816–17**, 545 μm long). Scale A (250 μm; ×110), figs. 1–3.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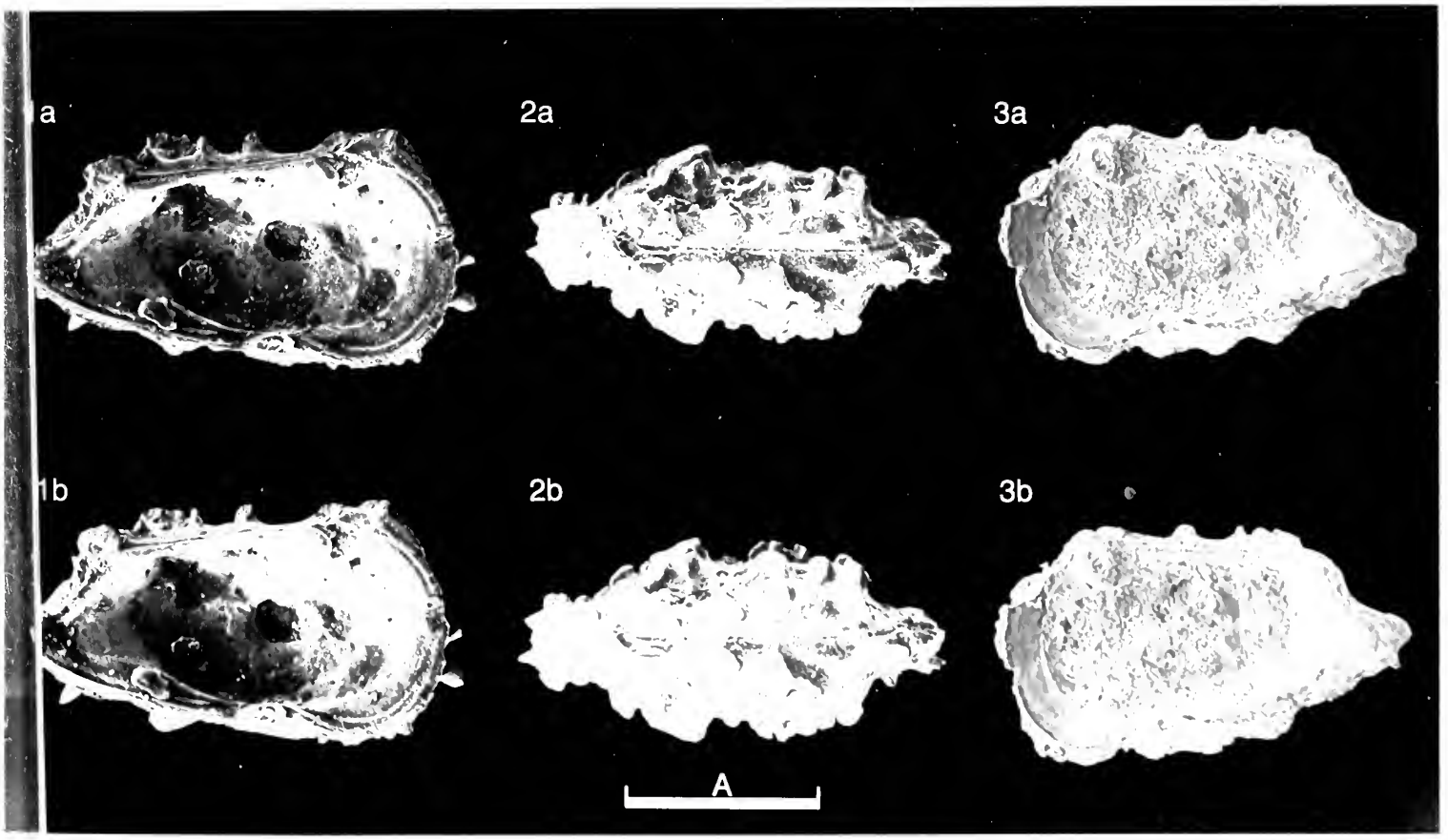
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ON *KOVALEVSKIELLA CAUDATA* (LUTZ)

by P. Carbonel, J.-P. Colin & L. Londeix
(University of Bordeaux, Talence & Esso Production Research, Bègles, France)

Kovalevskiella caudata (Lutz, 1965)

1965 *Gonuphocythere caudata* sp. nov. A. K. Lutz, *Geol. Jahrb.*, **82**, 311, text-fig. 27, pl. 13, figs. 1, 2.
1969 *Cordocythere caudata* (Lutz); G. Carbonnel & S. Ritzkowski, *Arch. Sci. (Genève)*, **22**(1), 60.
1980 *Kovalevskiella caudata* (Lutz); J.-P. Colin & D. Danielopol, *Paleobiol. continent.*, **11**(1), 32, 37, fig. 17.
1985 *Kovalevskiella caudata* (Lutz); P. Carbonel, *Bull. Centres. Rech. Explor.-Prod. Elf-Aquitaine, Mém.* **9**, pl. 90, figs. 7-10.
1986 *Kovalevskiella caudata* (Lutz); P. Carbonel, J.-P. Colin, D. L. Danielopol & L. Londeix, *Géobios*, **19**(6), pl. 1, figs. 4-7.

Holotype: Bundesanstalt für Bodenforschung, Hanover, no. **5421**, LV. [Paratype: no. **5420**, LV]

Type locality: Road cut between Undorf and Nittendorf near Regensburg. Bavaria, Federal Republic of Germany; Tortonian, Late Miocene; freshwater molasse.

Figured specimens: Dept. Geol. & Oceanography, Univ. Bordeaux I, **CO** nos. **5103** (LV: Pl. **14**, 42, figs. 1-3; Pl. **14**, 44, fig. 1), **5104** (RV: Pl. **14**, 42, figs. 4-6), **5105** (car.: Pl. **14**, 44, figs. 4, 5), **5106** (LV juv.: Pl. **14**, 44, fig. 2), **5107** (RV juv.: Pl. **14**, 44, fig. 3), **5108** (LV juv.: Pl. **14**, 44, fig. 6). Aquitanian, Miocene, of Le Moras, near Labrède, Gironde, France; lat. 44° 41′N, long. 0° 34′W. Original, German material could not be photographed.

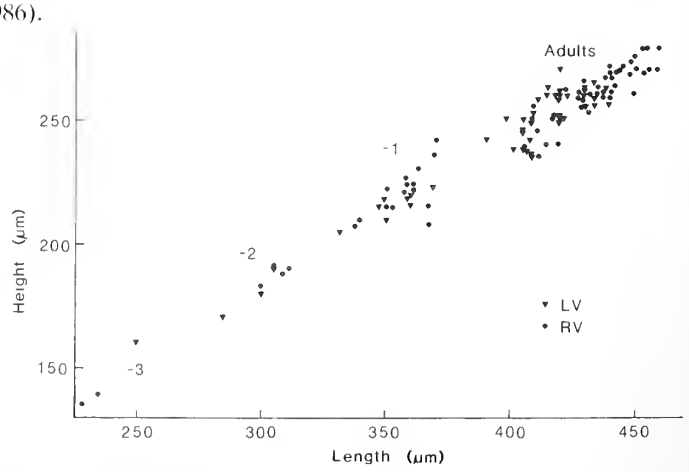
Diagnosis: Carapace subrectangular, rounded anterior and posterior extremities; ornament typical of genus: regularly disposed pustules. Well developed sulcus; large brood pouch. RV larger than LV; both cardinal hinge elements on LV trilobate. No sexual dimorphism. Two strong denticles on the posteroventral part of LV.

Explanation of Plate 14, 42

Figs. 1-3, LV (**CO 5103**, 430μm long); fig. 1, ext. lat.; fig. 2, int. lat. hinge; fig. 3, int. lat. Figs. 4-6, RV (**CO 5104**, 433μm long); fig. 4, int. lat.; fig. 5, ext. lat.; fig. 6, int. lat. hinge. Scale A (200μm; ×135), figs. 1, 3-5; scale B (200μm; ×205), figs. 2, 6.

Remarks: Like other *Kovalevskiella*, *K. caudata* is parthenogenetic. It differs by the presence of 2 strong denticles on the posteroventral part of the left valve. Denticles are also present in larval stages, but only in the right valve. In the French locality studied, this species lived in a lagoonal to lacustrine environment (in oligo-to mesohaline waters) on very fine grained, marl bottom sediment. *K. caudata* is associated with *Neocyprideis aquitanica* Moyes or with *Candoniopsis* and *Limnocythere*, and always with poorly diversified faunas. When the waters become fresh and more stable, *Kovalevskiella* disappears. Lutz (1965) described *K. caudata* from coaly marls in a freshwater molasse deposit. Its epibenthic life-style is very different to the hypogean or interstitial habitats of Recent *Kovalevskiella* (Colin & Danielopol 1980; Carbonel *et al.*, 1986).

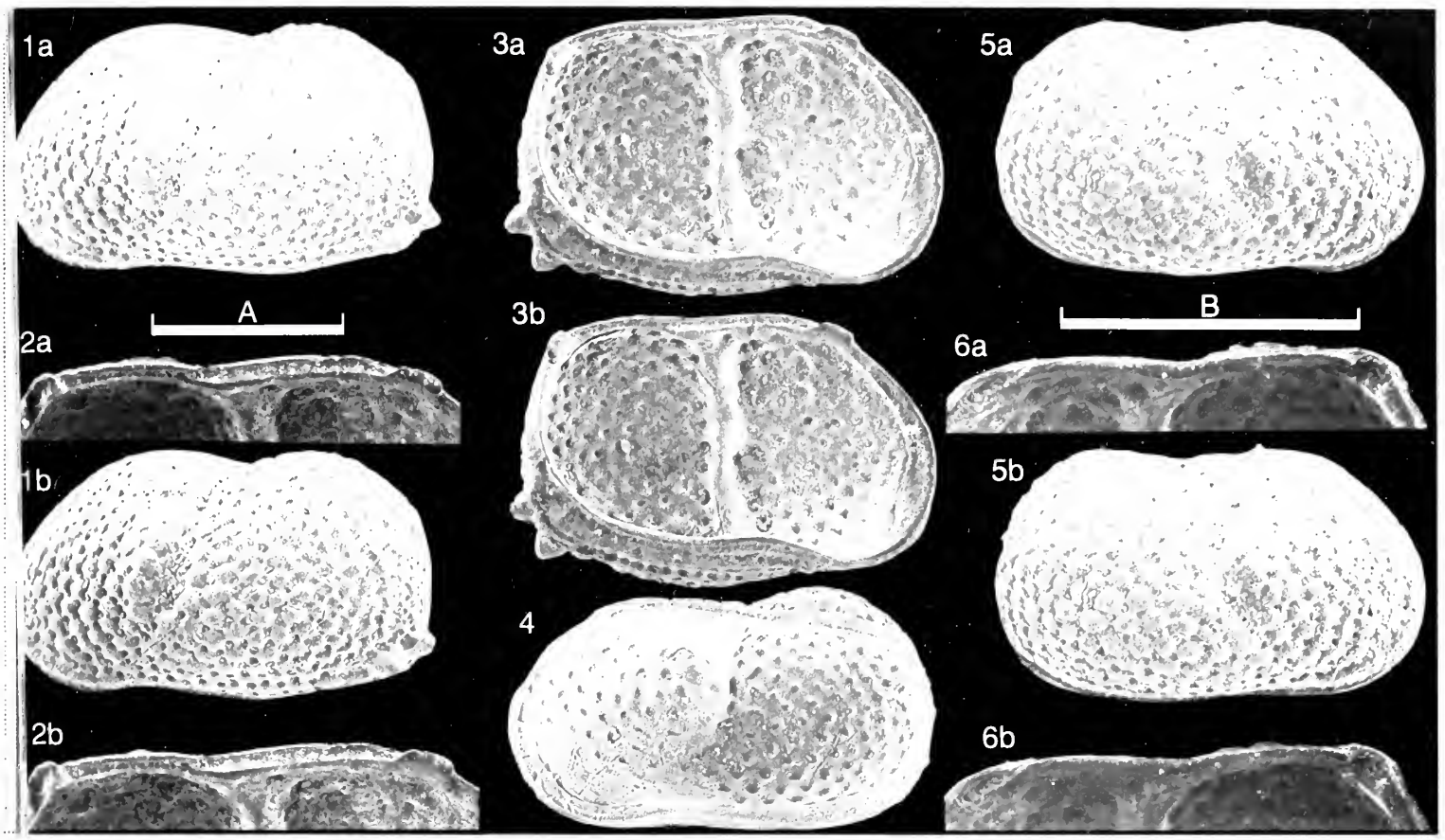
Distribution: Miocene (Tortonian) near Regensburg, Germany (Lutz 1965); Miocene (Aquitanian) near Bordeaux, France (Carbonel 1985; Carbonel *et al.* 1986).



Text-fig. 1. Size dispersion of 116 left and right valves of *K. caudata* from Le Moras, near Labrède, Gironde, SW France.

Explanation of Plate 14, 44

Fig. 1, LV ext. dors. (**CO 5103**, 430μm long); fig. 2, LV juv.-1, ext. lat. (**CO 5106**, 340μm long); fig. 3, RV juv.-2, ext. lat. (**CO 5107** 285μm long). Figs. 4, 5, car. (**CO 5105**, 420μm long): fig. 4, ext. dors.; fig. 5, ext. vent. Fig. 6, LV juv.-3, ext. lat. (**CO 5108**, 215μm long). Scale A (200μm; ×135), figs. 1-6.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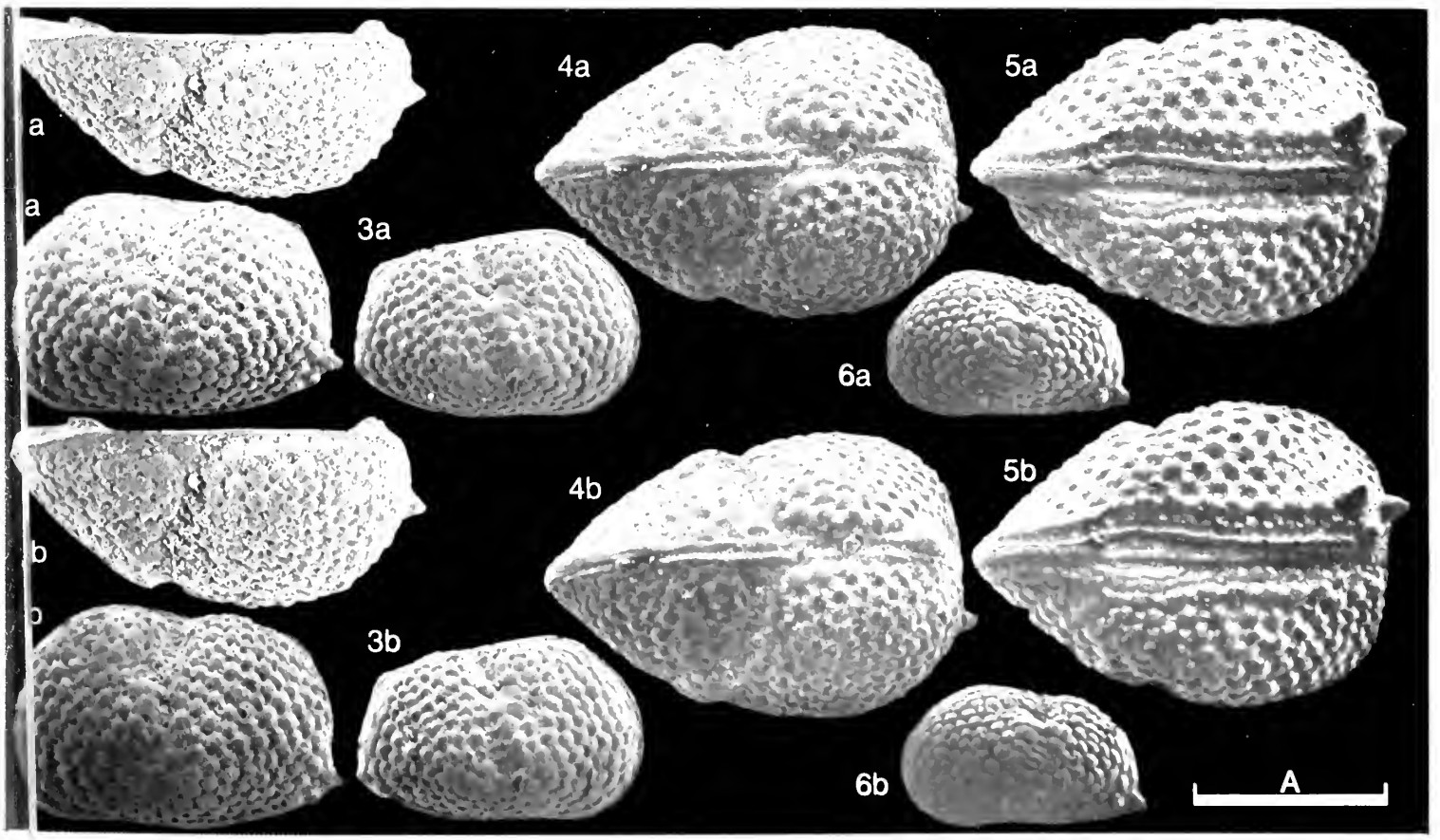
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b
b
3b
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A

595.339.1 (113.333) (64 : 162.008.31) : 551.35 + 552.52

ON *CALOCARIA MAURAE* VANNIER gen. et sp. nov.

by Jean Vannier
(University of Rennes, France)

Genus *CALOCARIA* gen. nov.

Type-species: *Calocaria maurae* sp. nov.

Derivation of name: From the Greek *karia*, a walnut and *kalos*, beautiful; alluding to the shell shape and lateral ornament. Gender feminine.

Diagnosis: Myodocopid ostracode, oval in outline. Length 3.5mm; adults have a length:height ratio of approximately 1.1. Prominent anterior rostrum and rostral incisure. Composite external ornament: pattern of coarse ridges running obliquely to the ventral and dorsal margins, converging towards the middle of the valve and connected ventrally to a continuous marginal ridge; posteriorly to mid-length, ornament consists of a linear alignment of more and less coalescent tubercles laterally merging with corrugations. Small arcuate muscle scar impression.

Remarks: This new genus shares many similarities (rostrum, simple muscle scar impression, oval outline) with other Silurian 'cypridinids' and is tentatively included within this group. Nevertheless, the composite ornament of *Calocaria* is comparable to that of Silurian 'bolbozoids' (see Siveter, Vannier & Palmer, *Palaeontology*, text-fig. 4, *in press*, 1987) but neither the distinctive anterodorsal bulb nor sulcus typical of that group occur in *Calocaria*. By its well developed ornament *Calocaria* is distinguished from any other Silurian 'cypridinids', which are mainly smooth (see Siveter, Vannier & Palmer, *Palaeontology*, pls. 2, 3, 5, *in press*, 1987). As with numerous myodocopids from the Silurian of Europe, most specimens of *Calocaria maurae* show 'plastic' deformation of the valves, suggesting a rather thin, flimsy shell.

Explanation of Plate 14, 46

Figs. 1-3, RV (holotype, **IGR 33100**, 3055μm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ornament of lateral surface. Scale A (750μm; ×18), figs. 1, 2; scale B (100μm; ×75), fig. 3.

Calocaria maurae sp. nov.

Holotype: Institut de Géologie, University of Rennes (**IGR**), France, coll. no. **33100**; RV.
[Paratypes: **IGR** coll. nos. **33101**, LV; **33103**, RV; **33104**, LV; **33106**, LV].

Type-locality: Siltstones and mudstones in the Talmakent section near Talmakent (sample TA 84452 of J. J. Cornée collections, University of Aix-Marseille, France), Haut-Atlas, Morocco; lat. 31° 52′N, long. 7° 45′W. Upper part of the Silurian; as determined by J. J. Cornée (work in progress).

Derivation of name: From *maura*, Moorish, alluding to the region where this species occurs.

Figured specimens: Inst. de Géologie, Univ. Rennes (**IGR**), coll. nos. **33100** (holotype, RV: Pl. **14**, 46, figs. 1-3; Pl. **14**, 48, figs. 1, 2) and **33101** (paratype, LV: Pl. **14**, 48, figs. 3-6). From type locality; latex casts.

Diagnosis: As for the genus. Monotypic.

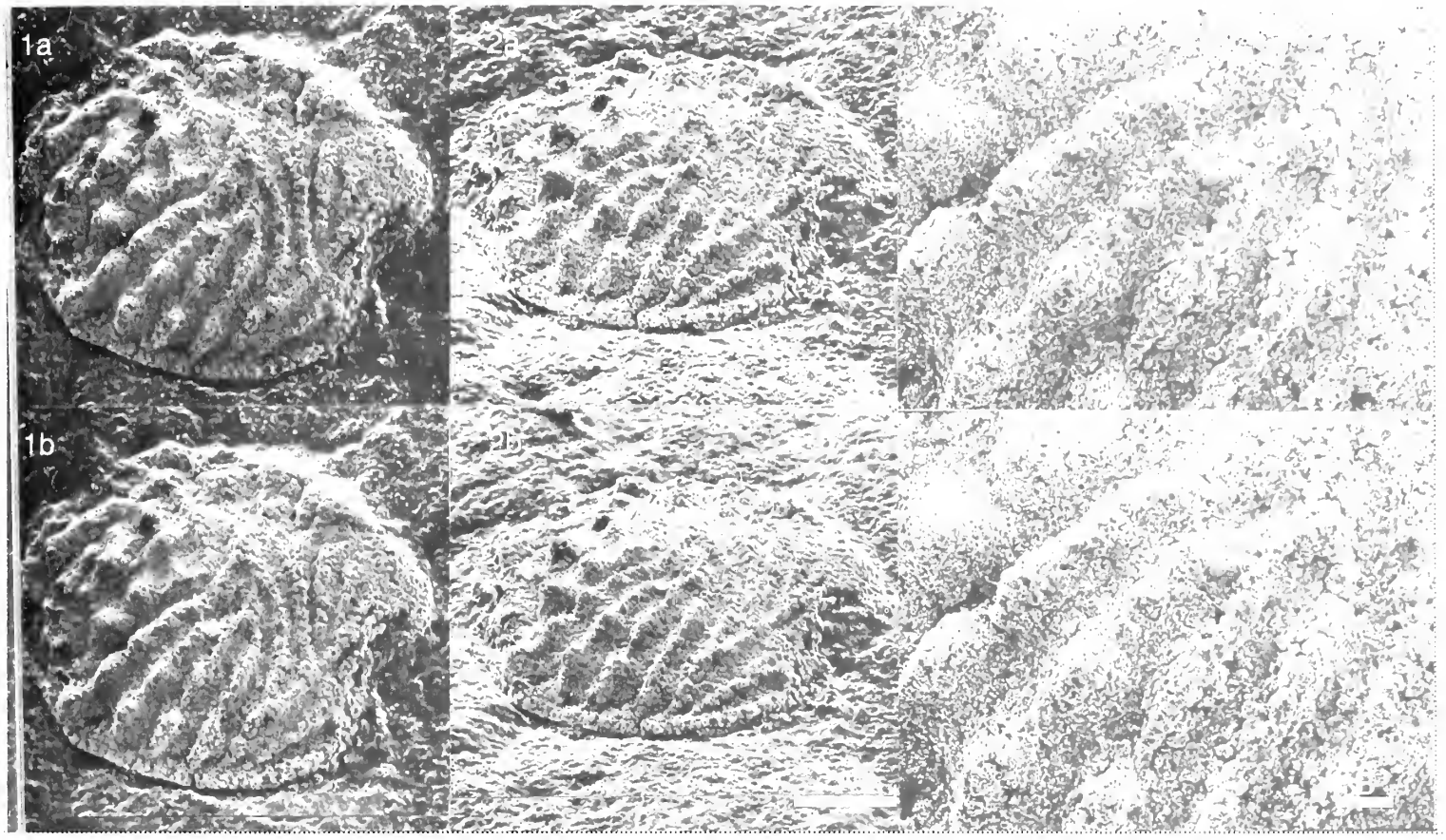
Remarks: *C. maurae* is the first Silurian myodocopid to be described from Africa. In the type locality, it is associated with numerous other myodocopid ostracodes, both 'bolbozoids' and 'cypridinids'. In this respect, this fauna is comparable to that recently documented from organic-rich, Silurian sediments of Britain and France (Siveter, *et al.*, *op. cit.*, *in press*). As a prelude to their further systematic studies of Silurian myodocopids the latter authors have noted the occurrence of similar myodocopid faunas in the same type of deposits (black to terrigenous mudstones) from northwestern Europe (e.g. Ludlow Series in Wales and the Armorican Massif, France), eastern Europe (Ludlow Series of Bohemia, Czechoslovakia) and now North Africa (herein). An outer shelf to shelf margin or even shelf slope environment is inferred, from faunal and sedimentological evidence, for the myodocopid occurrences in Europe (see Siveter, *et al.*, *op. cit.*, *in press*) and is also likely in the case of the Moroccan material.

Distribution: At present, known only from the type locality.

Acknowledgements: To J. J. Cornée (University of Aix-Marseille) for allowing me to study his material and to the Humboldt Foundation (Bonn) for my Research Fellowship at Hamburg University.

Explanation of Plate 14, 48

Figs. 1, 2, RV (holotype, **IGR 33100**, 3055μm long): fig. 1, ext. ant. obl.; fig. 2, ext. post. obl. Figs. 3-6, LV (**IGR 33101**, 3050μm long): fig. 3, ext. lat.; fig. 4, ext. vent. obl.; fig. 5, ext. ant. obl.; fig. 6, ext. post. obl. Scale A (750μm; ×18), figs. 1-6.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595.336.13 (113.312) (437 : 161.013.49) : 551.35 + 552.52

ON *SPINOHIPPULA ESURIALIS* VANNIER, KRŮTA & MAREK gen. et sp. nov.

by Jean Vannier, Miroslav Krůta & Ladislav Marek
(University of Rennes, France; Academy of Sciences, Prague, Czechoslovakia)

Genus *SPINOHIPPULA* gen. nov.

Type-species: *Spinohippula esurialis* sp. nov.

Derivation of name: Alluding to velar spines and ressemblance with species of the tribe Hippulini. Gender feminine.

Diagnosis: Medium sized glossomorphitine (adults < 1.2mm long). Lateral surface virtually lacks lobation: sulci only expressed dorsally as two very poorly marked depressions, presumably representing S2 and S3. Strong velum extending from near anterior cardinal corner to posteromedium or posterodorsal part of valve and bearing a distinctive coarse denticulation along inner margin bordering a deep (maximum depth ventrally and anteriorly) fissum-like laterovelar furrow. Dimorphism mainly expressed in females by a broad crescent-like velar flange and a wide concave subvelar area (dolonal antrum) both ends of which connect with lateral surface of valve. Inner velar spines converging towards middle of domicilium tend to reach the lateral surface over the laterovelar furrow. Tecnomorphs have narrower velum reduced to a row of radiating velar spines, with laterovelar furrow more open than in females; marginal sculpture unknown.

Remarks: The inclusion of *Spinohippula* within the Glossomorphitinae (see R. Schallreuter, *Palaeontographica A*, **180**, 1983) is justified by the occurrence of a strong velar sculpture in both females and tecnomorphs, and well marked velar dimorphism. The shape of the velar flange in females is its most significant glossomorphitine feature, consisting of a massive adventral sculpture (Pl. **14**, 52, fig. 2) high the domicilium. Comparable features are in typical glossomorphitines such as *Collibolbina collis collis* (Schallreuter, 1964) (see R.

Explanation of Plate 14, 50

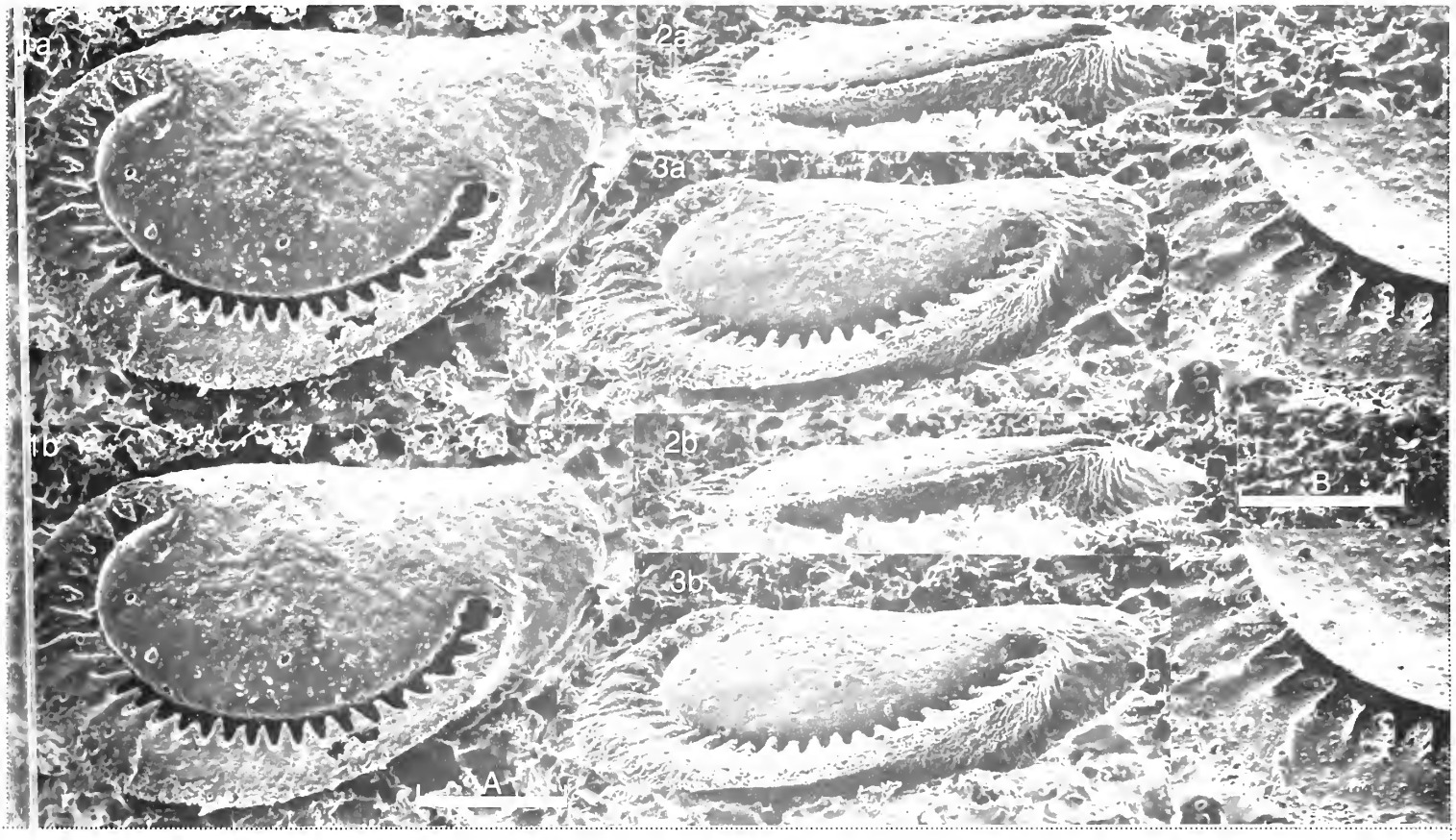
Figs. 1-4, ♀ LV (holotype, **NM L26073**, 1188μm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl. (tilted 75°); fig. 3, ext. dors. obl. (tilted 45°), antero-vent. part of the valve. Scale A (300μm; ×69), figs. 1-3; scale B (200μm; ×115), fig. 4.

Remarks: (cont.) Schallreuter, *op. cit.*, 1983) from the middle Ordovician of Baltoscandia or *Gracquina hispanica* (Born, 1918) (see J. Vannier, *Palaeontographica* A, **193**, 1986) from the Llandeilo of France and Spain.

Schallreuter (*op. cit.*, 1983) divided the subfamily Glossomorphitinae into three tribes on the basis of different types of velar dimorphism. *Spinohippula* shares strong similarities with representatives of the tribe Hippulini, especially *Hippula* and *Paralhippula*. Although no typical torus is observed (in addition to the velar flange) in *Spinohippula*, the general morphology of its adventral region is strikingly comparable to that of *Hippula* (subgenera *H. (Hippula)* and *H. (Cetona)*) and *Paralhippula*. Schematically, the shape (crescent-like sculpture), position and nature (main adventral sculpture with hollow spaces and/or radiating structures) of the velum (Text-fig. 2) are three important characteristics similar in *Spinohippula* from the middle Ordovician of Czechoslovakia, *Paralhippula* from the middle Ordovician of United States, and numerous species of *Hippula* from the Ordovician of Europe and North America (see R. Schallreuter & M. Kruta, *N. Jb. Paläont. (Mh)*, **8**, 1980). In *Spinohippula* the row of velar denticulation (26 spines in holotype) (Pl. **14**, 50, fig. 4; Pl. **14**, 52, fig. 4) associated with a deep laterovelar furrow forms a semi-open peripheral groove (Text-fig. 1a) at the junction of the lateral, marginal and velar surfaces. By comparison, *H. (Cetona)* (Text-fig. 1b), an example of a typical unitoral hippuline, exhibits a row of short, flattened tubule-like spaces (= part of torus) connected to the velum, exactly at the same place as the semi-open groove in *Spinohippula*. Moreover, openings of these hollows (13 in females of *H. (C.) cetona cetona* = half the number of velar spines in the holotype of *S. esurialis*) are also impressed on the velar flange surface (cf. Text-figs. 1a & 1b). Similar comparisons could also be attempted with *H. (Hippula)* characterized by two tori (Text-fig. 2d). The velar flange of *Paralhippula* (Text-fig. 1c) is considered by Kraft (*Mem. geol. Soc. Am*, **86**, 1962) as a "hollow velate frill formed of two layers continuous with the outer layer of shell wall". The interpretation of this "hollow structure" is problematic, bearing in mind that two-layered structures frequently observed on silicified specimens (see D. J. Siveter, *Stereo-Atlas Ostracod Shells*, **12** (10), pl. 54, fig. 4) may be the result of diagenetic processes. Nevertheless, as stated by Kraft, "the logical structure of the carapace wall" of *Paralhippula* is a convincing argument for true hollow spaces within the velum (as reconstructed in Text-fig.

Explanation of Plate 14, 52

Figs. 1-4, ♀ LV (holotype, **NM L26073**, 1188μm long): fig. 1, ext. dors. obl. (tilted 45°); fig. 2, ext. post. obl. (tilted 75°); fig. 3, ext. ant. obl. (tilted 75°), postero-vent. part of the valve; fig. 4, ext. post. obl. (tilted 55°). antero-vent. part of the valve. Scale A (300μm; ×69), figs. 1, 2; scale B (200μm; ×115), figs. 3, 4.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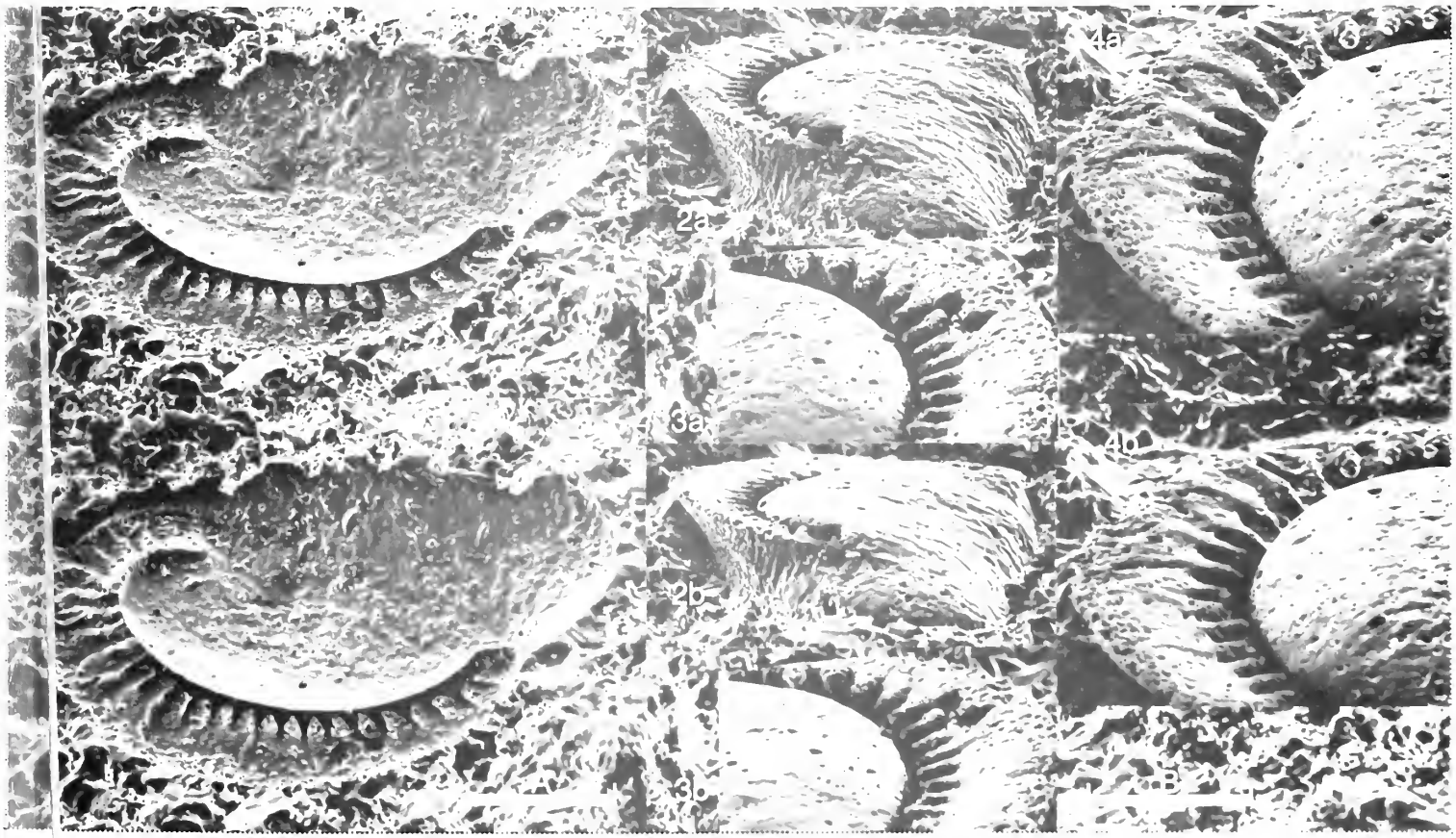
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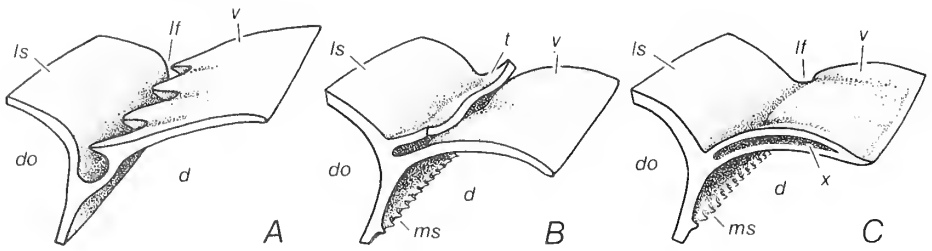
Remarks: (cont.) 1c). In this case: 1) the hollow spaces (13 in females; Text-fig. 2c) within the velar flange of *Parahippula*, and 2) its deep laterovelar furrow showing 12 secondary radiating tiny furrows on the velar flange, may represent homologous structures of the 13 toral hollows of *H. (Cetona)* (Text-fig. 2b) and the semi-open laterovelar groove of *Spinohippula* (Text-fig. 2a) respectively.



Text-fig. 1. Reconstructions of the adventral sculpture in three genera of the tribe Hippulini Schallreuter, 1983: A, *Spinohippula* gen. nov.; B, *Hippula*; C, *Parahippula*. All views represent medioventral cross-sections of valves (see Text-fig. 2). d = dolonal antrum; do = domicilium; lf = laterovelar furrow; ls = lateral surface; ms = marginal sculpture (row of spines); t = torus; v = velar flange; x = probable hollows within the velar flange.

Spinohippula esurialis sp. nov.

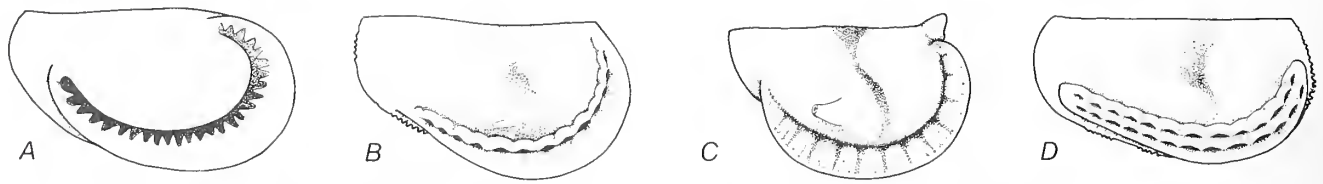
Holotype: National Museum, Prague (NM), Czechoslovakia, coll. no. **L26073**; ♀ LV.
[Paratypes: NM, Prague, coll. nos. **L26074**, tecnomorph RV; **L26075**, ♀ LV]. Casts of the holotype and paratypes are in the Institute of Geology, University of Rennes, France.

Type locality: Ejpovice (borehole), 10km E of Plzen, WSW of Prague, Bohemia, Czechoslovakia; approx. lat. 49° 47′N, long. 13° 38′E. Sandstones, Skalka quartzite Dobrotiva (Llandeilo ?) 'series', Ordovician.

Derivation of name: Latin, *esurialis*, hungry; referring to the teeth-like velar spines.

Explanation of Plate 14, 54

Figs. 1-3, tecnomorph RV (paratype, **NM L26074**, 838μm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl. (tilted 45°); fig. 3, ext. post. obl., part of the valve. Scale A (300μm; ×93), figs. 1, 2; scale B (200μm; ×115), fig. 3.



Text-fig. 2. Three genera of the tribe Hippulini Schallreuter, 1983. All lateral views of female right valves. A, *Spinohippula esurialis* gen. et sp. nov., from the Dobrotiva series (Llandeilo ?) of Czechoslovakia, approximately ×95. B, *Hippula (Cetona) cetona cetona* (Schallreuter, 1964), from Backsteinkalk erratic boulders of northern Germany, middle Ordovician, approximately ×80 (after Schallreuter 1983, *op. cit.* pl. 3, fig. 1). C, *Parahippula ventrospina* (Kraft, 1962), from the middle Ordovician of Virginia, United States, approximately ×65 (after Kraft 1962, *op. cit.*, pl. 12, fig. 5). D, *Hippula (Hippula) latonoda* (Schallreuter, 1964), from the Upper Viru series (Caradoc) of Baltoscandia, approximately ×100 (after Schallreuter 1983, *op. cit.*, pl. 5, fig. 1).

Figured specimens: National Museum, Prague (NM), Czechoslovakia, coll. nos. **L26073** (holotype, ♀ LV: Pl. **14,** 50, figs. 1-4; Pl. **14,** 52, figs. 1-4), **L26074** (paratype, tecnomorph RV: Pl. **14,** 54, figs. 1-3), **L26075** (paratype, ♀ LV: Pl. **14,** 56, figs. 1-3). Silicone rubber casts of topotype specimens.

Diagnosis: As for the genus. Monotypic.

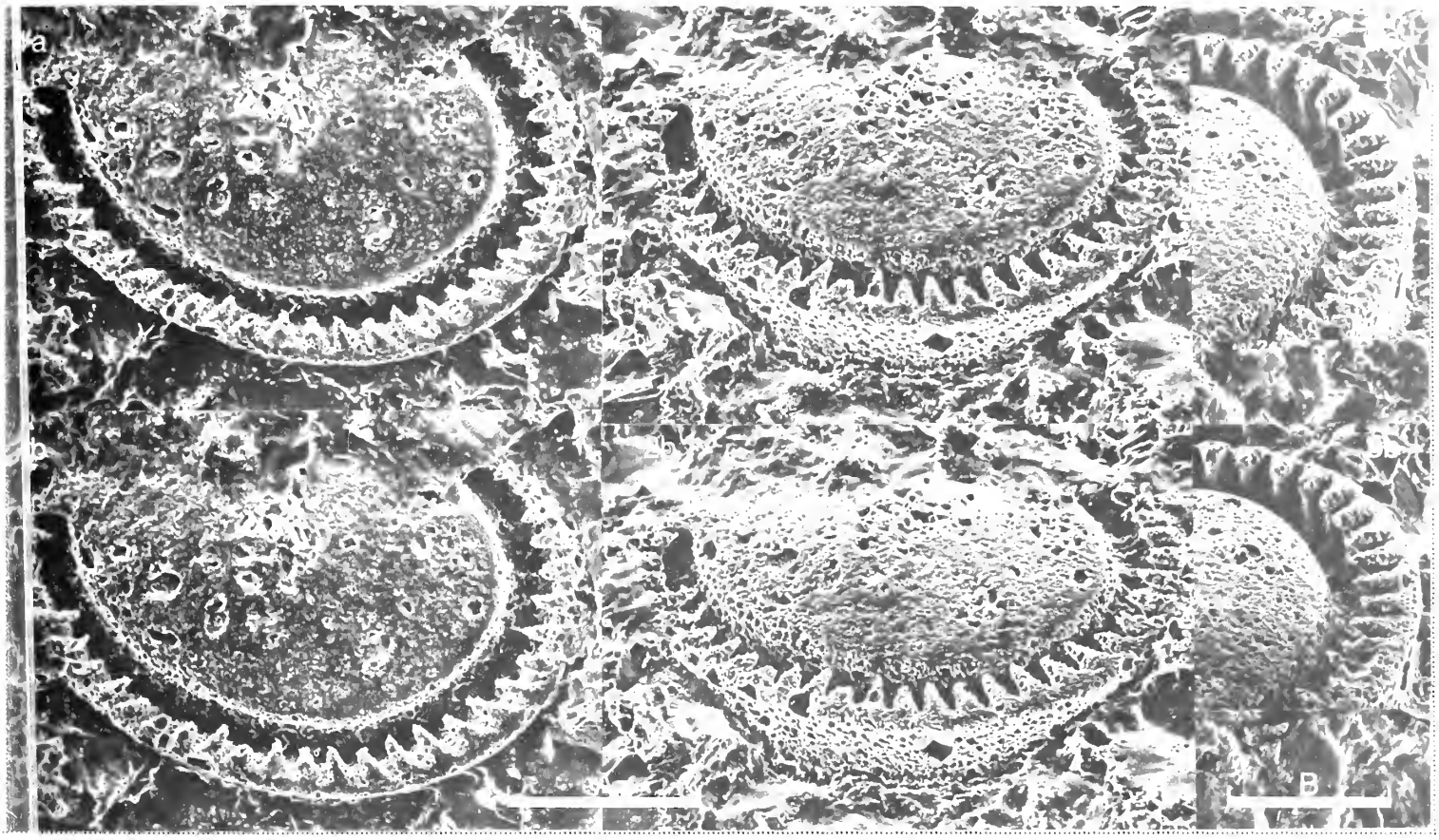
Remarks: The laterovelar furrow represents a major concavity, widely extended ventrally, but not connected to the domiciliar cavity and protected from the outside by a row of spines; it could be interpreted as an external botulus-like brood concavity. More likely, this groove is homologous to a cavum (see R. Schallreuter *in* R. Maddocks (Ed.), *Proc. 8th Int. Symp. on Ostracoda, Houston, Texas*, 1983) or a fissum. Some tvaerenellids exhibit an arcuate cavum which tends to be closed by spines in the same way as the laterovelar furrow of *S. esurialis*. *Huckea huckea* (see R. Schallreuter, *Palaeontographica A*, **149**, pl. 9, figs. 1-4, 1975) shows a ventral fissum positioned similarly to the furrow in *S. esurialis*. The exact function of the cavum (buoyancy control?) or fissum is still unknown but might represent an attempt to lighten the shell.

Distribution: At present known only from type locality.

Acknowledgements: To the Humboldt Foundation (Bonn) for my Research Fellowship at Hamburg University.

Explanation of Plate 14, 56

Figs. 1-3, ♀ LV (paratype, **NM L26075**, 1107μm long): fig. 1, ext. lat.; fig. 2, ext. dors. obl., postero-vent. part; fig. 3, ext. post. obl., medio-vent. part. Scale A (300μm; ×76), fig. 1; scale B (200μm; ×115), fig. 2; scale C (100μm; ×250), fig. 3.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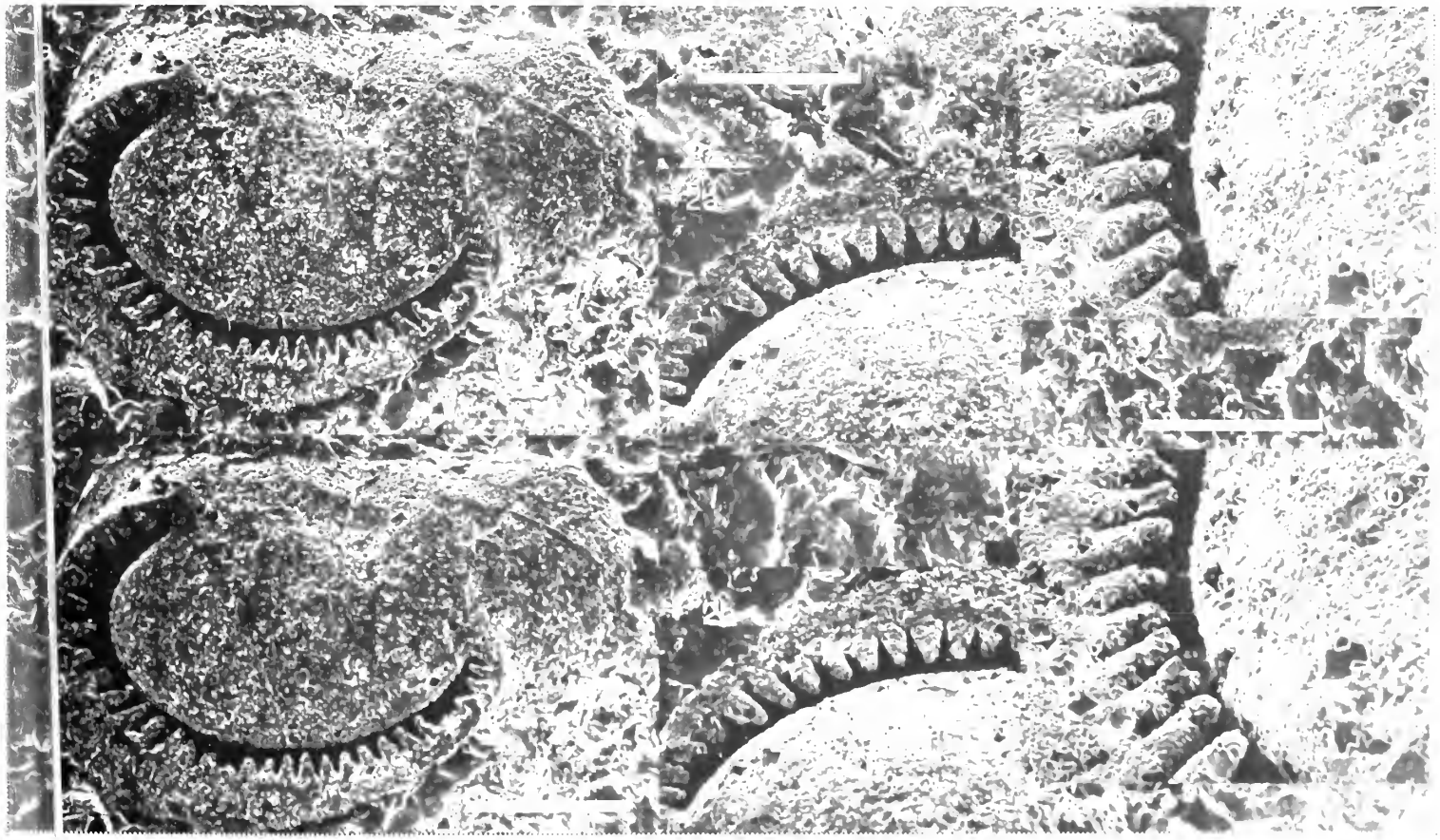
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595.336.11 (113.331) (481 : 161.010.59) 551.35 + 552.54

ON *BEYRICHIA (SAGENABEYRICHIA) SIVETERI* POLLICOT subgen. et sp. nov.

by Paul D. Pollicott
(University of Leicester, England)

Subgenus *BEYRICHIA (SAGENABEYRICHIA)* subgen. nov.

Type-species: *Beyrichia (Sagenabeyrichia) siveteri* sp. nov.

Derivation of name: Latin *sagena*, fish-net; alluding to the reticulate ornament of the lobes + the genus *Beyrichia*.

Diagnosis: *Beyrichia* with reticulo–tuberculate lobal ornament. Crumina elongate and relatively well assimilated with lobal area. Syllobium weakly cuspidate; anterior cusp slightly more prominant, posterior often lacking. Syllobial groove low and often above a well developed callus. Zygal arch lacking.

Remarks: The lobal reticulation of *B.* (*Sagenabeyrichia*) is unique within *Beyrichia*. Moreover, the occurrence of reticulation in an otherwise typical beyrichiine species has significance for beyrichiacean phyllogeny, particularly in the relationship between amphitoxotidines and beyrichiines. Henningsmoen (*Geol. Fören. Stockh. Förh.*, **86**, 387-9, 1965) thought that amphitoxotidines, with their typically tubulose velar frill, evolved from beyrichiines (*Beyrichia* subgenera). In contrast, Martinsson (*Bull. geol. Instn. Univ. Uppsala*, **42**, 56, 1963) thought that a stabilized surface reticulation within the amphitoxotidines was entirely foreign to typical beyrichiines (although reticulation is known in atypical Beyrichiidae such as *Bingeria:* see A. Martinsson *Bull. geol. Instn. Univ. Uppsala.*, **41**, 1962), a subfamily which, furthermore, he

Explanation of Plate 14, 58

Fig. 1-3, ♂ RV (**PMO 116.231,** 2.00 mm long): fig. 1, ext. lat.; fig. 2, ext. vent.; fig. 3, ext. vent. obl. Figs. 4, 5, ♂ LV (**PMO 116.232,** 1.32 mm long): fig. 4, ext. dors. obl.; fig. 5, ext. lat.
Scale A (370 μm; × 28), figs. 1-3; scale B (260 μm; × 40), figs. 4, 5.

Remarks: (cont.) considered more 'advanced' by lacking a tubulose velum. Henningsmoen (*op. cit.*) thought that reticulation in the beyrichiines was an undeveloped possibility and, if found, its occurrence would indicate a possible beyrichiine derivation for the amphitoxotodines. The lobal reticulation of *Beyrichia (Sagenabeyrichia)* supports his idea.

B. (Sagenabeyrichia) further differs from many typical *B. (Beyrichia)* species by its better assimilated crumina, a feature which it has in common with species of *B. (Simplicibeyrichia)*, especially *B. (S.) callifera* and *B. (S.) duplicicalcarata* (both Martinsson *op. cit.*, 1962). *B. (Sagenabeyrichia)* differs markedly from *B. (S.) globifera* Martinsson, 1962 by its reticulation, lack of a calcarine spine, its often well developed syllobial groove/callus and in having a long, better defined preadductorial sulcus.

Beyrichia (Sagenabeyrichia) siveteri sp. nov.

1954 *Beyrichia (Beyrichia)* cf. *kloedeni* McCoy 1846; G. Henningsmoen, *Norsk. geol. Tidsskr.*, **34**, 40-43 (*pars*), pl. 2, fig. 7, 10-18, pl. 3, figs. 2-7; ? pl. 2, fig. 9.

Holotype: Paleontologisk Museum, Oslo, Norway, **PMO 116.233;** ♀ RV (broken posteriorly).

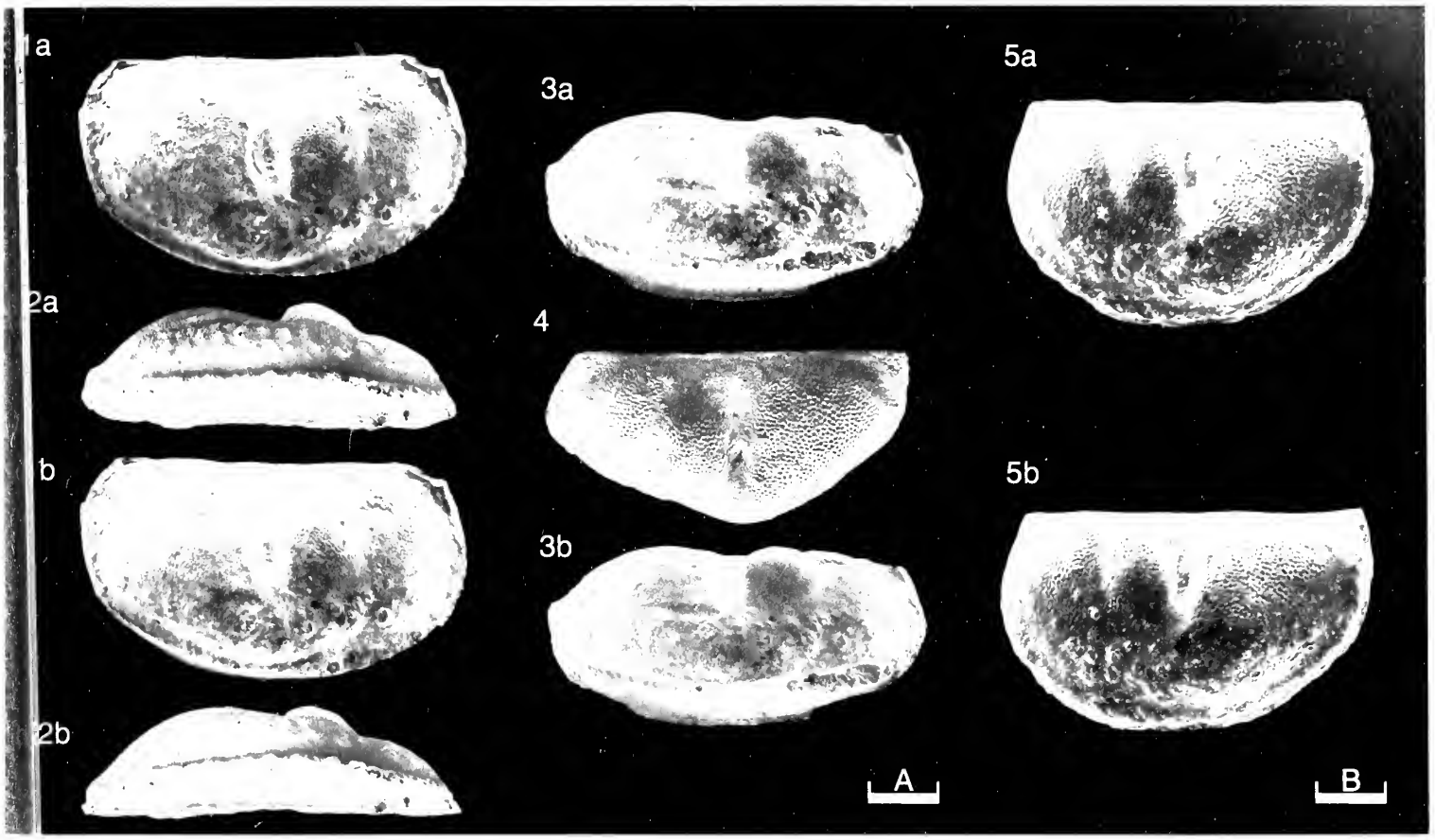
Type locality: Coastal section, southern tip of Kommersøya (east side), Holmestrand, Norway. Steinsfjorden Formation, '9cβ' of Kiaer (*Skr. Vidensk. Selsk. Kristiania I Mat. – Naturv. Kl.* 1906 **II**, 596 pp.); Wenlock Series, Silurian. Approx. lat. 59° 32′N, long. 10° 18′E.

Derivation of name: After Dr. David J. Siveter, University of Leicester, England.

Figured specimens: Paleontologisk Museum, Oslo, nos. **PMO 116.231** (♂ RV: Pl. **14**, 58, figs. 1, 2, 3), **PMO 116.232** (♂ LV: Pl. **14**, 58, figs, 4, 5, Pl. **14**, 62, fig. 1), **PMO 116.233** (♀ RV: Pl. **14**, 60, fig 1) **PMO 116.234** (♀ RV: Pl. **14**, 60, figs. 2, 3), **PMO 116.235** (♀ LV: Pl. **14**, 60, fig, 4, 5), **PMO 116.236** (♂ LV: Pl. **14**, 62, fig 2, 5), **PMO 116.237** (♂ LV: Pl. **14**, 62, fig. 3), **PMO 116.238** (♂ LV: Pl. **14**, 62, fig, 4), **PMO 116.239** (♂ LV: Pl. **14**, 64, fig. 1), **PMO 116.240** (♂ LV: Pl. **14**, 64, fig. 2), **PMO 116.241** (♂ RV: Pl. **14**, 64, fig. 3).

Explanation of Plate 14, 60

Fig. 1, ♀ RV, ext. lat. (holotype **PMO 116.233**, 2.00 mm long). Figs. 2, 3, ♀ RV (**PMO 116.234**, 2.50 mm long): fig. 2, ext. vent.; fig. 3, ext. vent. detail of crumina. Figs. 4, 5, ♀ LV (**PMO 116.235**, 2.48 mm long): fig. 4, ext. vent. obl.; fig. 5, ext. lat.
Scale A (390 μm; × 25), fig. 1; scale B (286 μm; × 35), fig. 3; scale C (470 μm; × 22), figs. 2, 4, 5.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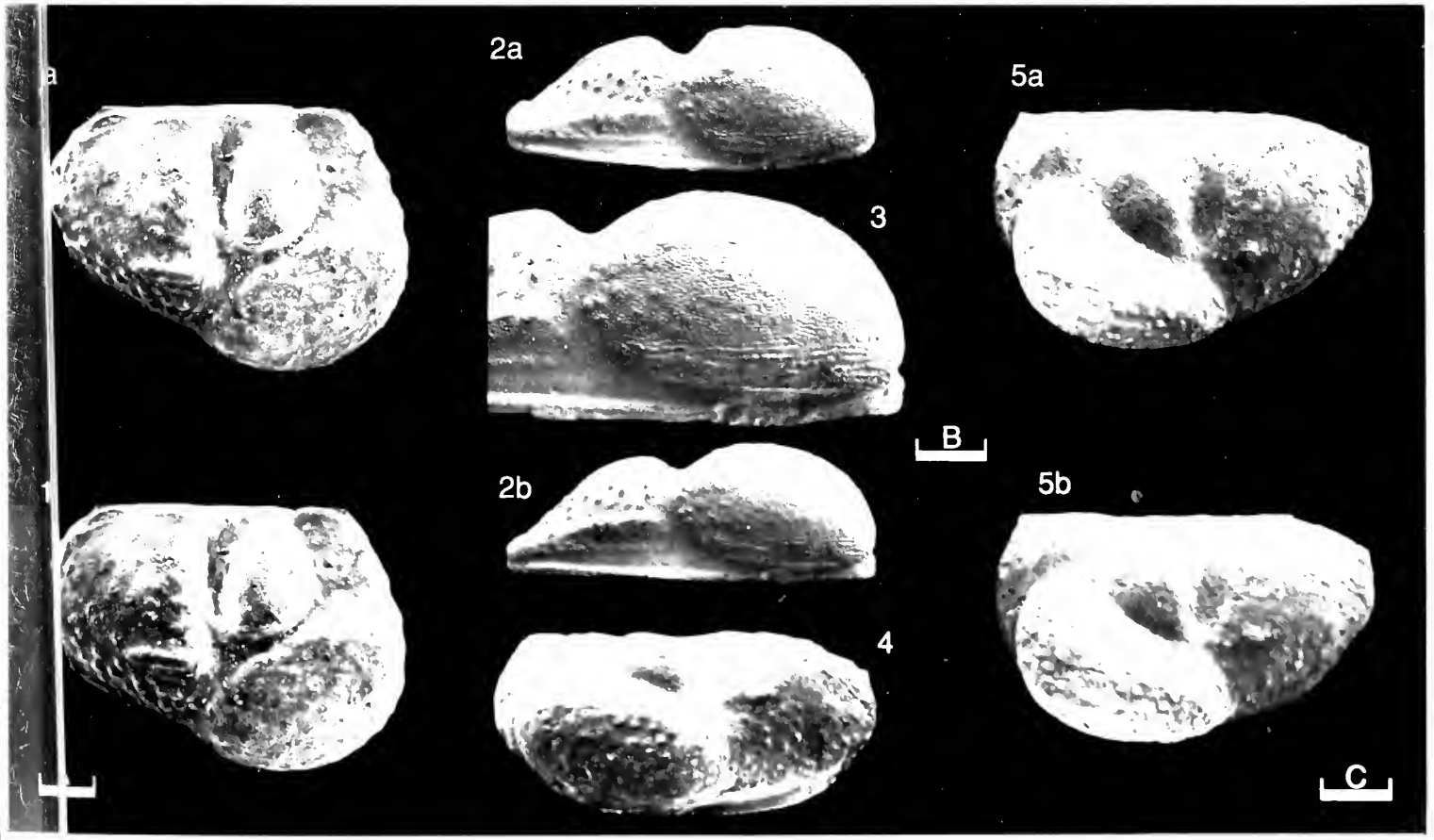
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C

Figured specimens: (cont.) All figured specimens are from the Steinsfjorden Formation (9c), Sjorvoll, Ringerike, except for **PMO 116.233** (holotype) and **PMO 116.238**, which are from the type horizon and locality. All specimens are prepared by mechanical preparation techniques from limestone slabs.

Diagnosis: As for the subgenus. *B. (Sagenabeyrichia)* is monotypic.

Remarks: *B. (S.) siveteri* exhibits wide variation in both lobal reticulation and tuberculation. Most valves are reticulate over the entire lobal area, but in a few specimens, reticulation is lacking on the anterior lobe (possibly a feature of preservation?). Tuberculation varies from forms with extensive cover (mostly adults) to those in which it is lacking (small tecnomorphs). Reticulation is relatively smaller in larger forms, and tubercles are commonly restricted to a supra-velar field (Pl. **14**, 58, figs. 1, 5).

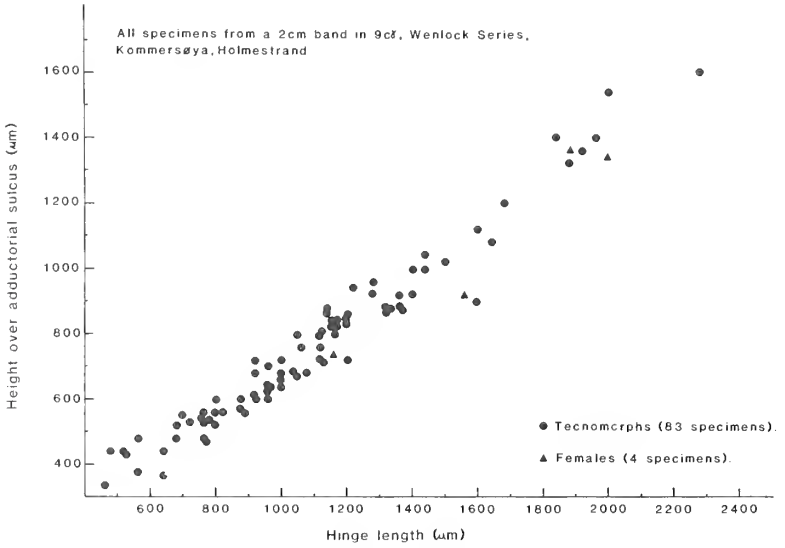
Size variation of female adults is common within a single sample (see Text-fig. 1). This is thought to reflect mixed populations (chronodemes and/or ecodemes) rather than a possible case of precocious dimorphism (unknown in Beyrichiacea).

Distribution: The Wenlock Series, Silurian of Norway. Collected from localities in the Steinsfjorden Formation (see Worsley, D. (ed.), *Nor. geol. unders. 384*, 1982) at Ringerike (9b-9e of Kiaer, *op. cit.*) and Holmestrand (9b-9c of Kiaer, *op. cit.*).

Explanation of Plate 14, 62

Fig. 1, ♂ LV, reticulation on syllobium (**PMO 116.232**, 1.32 mm long). Figs. 2, 5, ♂ RV (**PMO 116.236**, 2.32 mm long): fig. 2, ext. lat.; fig. 5, reticulation and tuberculation on syllobium. Fig. 3, ♂ LV, ext. lat. (**PMO 116.237**, 2.48 mm long). Fig. 4, ♂ LV, ext. lat. (**PMO 116.238**, 1.20 mm long).

Scale A (21 μm; × 460), fig. 1; scale B (455 μm; × 23), figs. 2, 3; scale C (230 μm; × 40), fig. 4; scale D (62 μm; × 150), fig. 5.

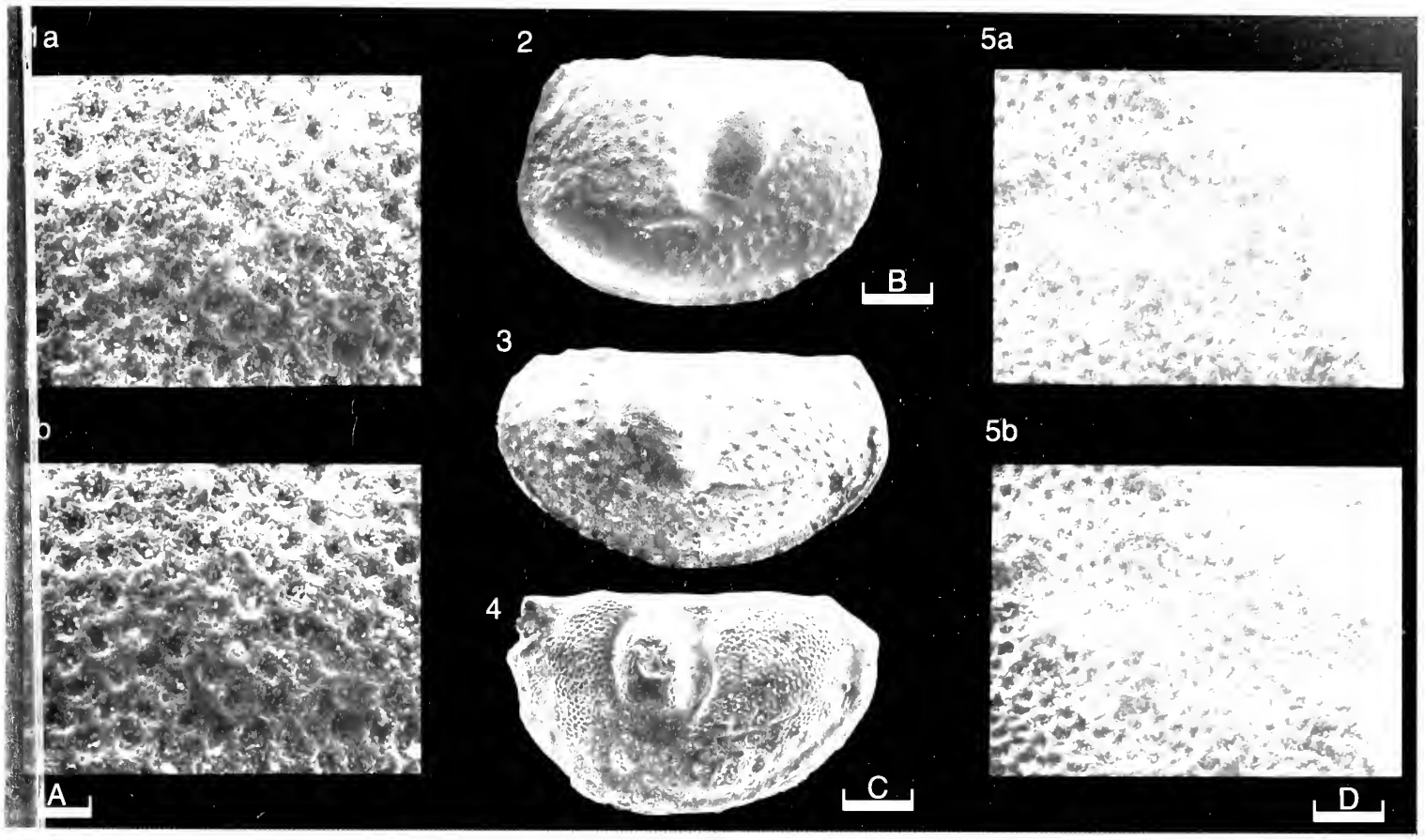


Text-fig. 1. Size variation within *B. (Sagenabeyrichia) siveteri* from the Steinsfjorden Formation (9c of Kiaer *op. cit.*), Wenlock Series at Kommersøya, Holmestrand, Norway.

Explanation of Plate 14, 64

Fig. 1, ♂ LV, ext. lat. (**PMO 116.239**, 2.72 mm. long). Fig. 2, ♂ LV, ext. lat. (**PMO 116.240**, 2.68 mm. long). Fig. 3 ♂ RV, ext. lat. (**PMO 116.241**, 2.68 mm. long).

Scale A (545 μm; × 18), figs. 1-3.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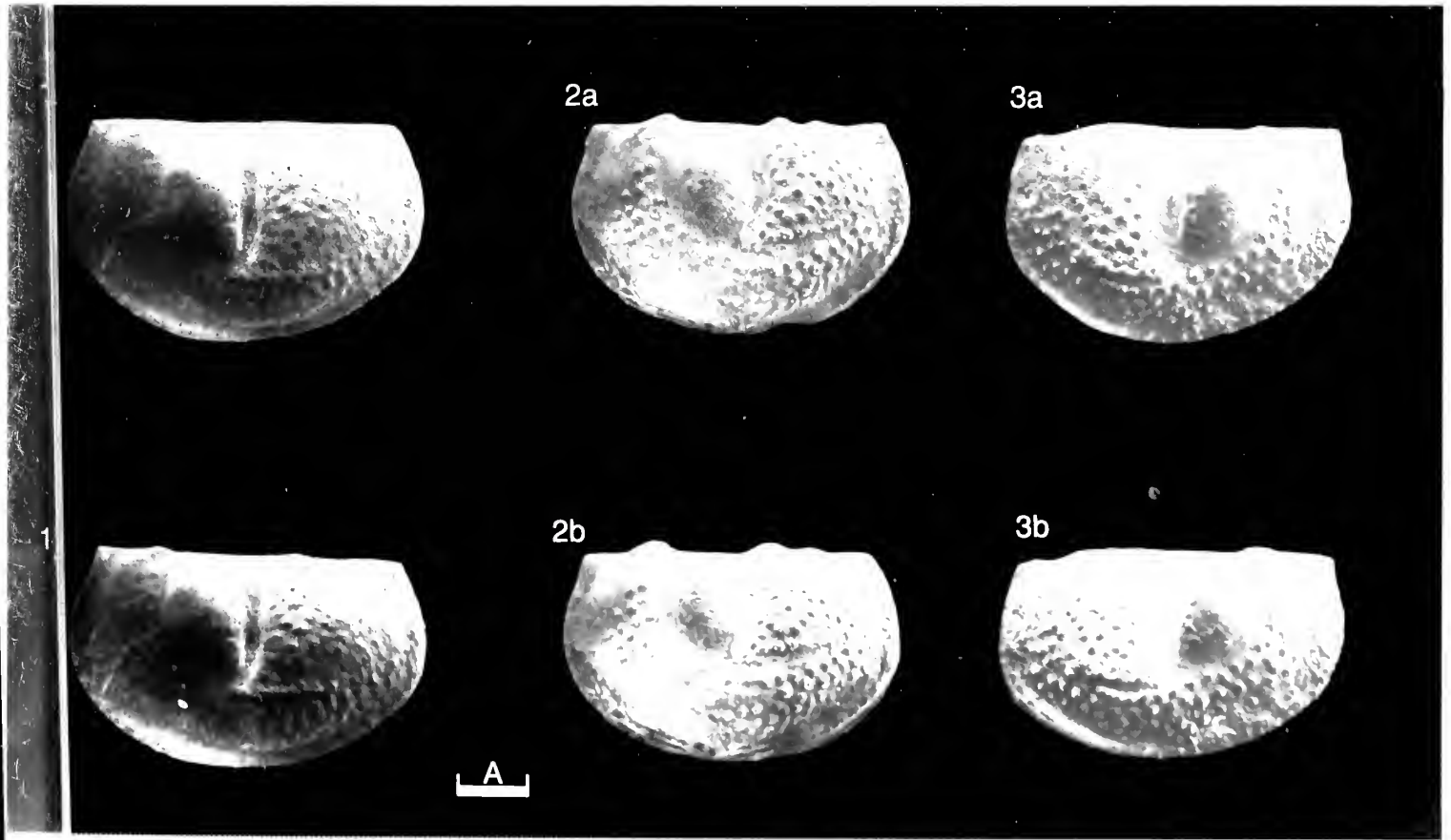
D


1
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2b
3a
3b
A

595.337.14 (119.9) (415 : 162.011.51) : 551.351

ON *BYTHOCYTHERE INTERMEDIA* ELOFSON

by David J. Horne
(Geology Department, City of London Polytechnic)

Bythocythere intermedia Elofson, 1938

1868 *Bythocythere constricta* Sars; G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, (*pars*), 451–452, pl. 35, figs. 48–52 only (*non* pl. 35, fig. 47) (*non* Sars, 1866).

1938 *Bythocythere intermedia* sp. nov. O. Elofson, *Ark. Zool.*, **30A**, 10, text-figs. 14–21.

1983 *Bythocythere intermedia* Elofson; J. Athersuch, D. J. Horne & J. E. Whittaker, *J. micropalaeontol.*, **2**, 72–73, text-figs. 1, 2, 3a–g, 4r–t, 5b; pl. 2, figs. 1–4.

Type specimens: The whereabouts of Elofson's type material is not known.

Type locality: The Mittskaren, outside the mouth of Gullmar Fjord, W. Sweden, approx. lat. 58° 15′ N, long. 11° 30′ E; Recent, marine, sublittoral.

Figured specimens: British Museum (Nat. Hist.) nos. **1982.345** (♂ LV: Pl. **14**, 68, fig. 1; copulatory appendage: Text-fig. 1), **1982.346** (♀ LV: Pl. **14**, 66, fig. 2; RV: Pl. **14**, 66, fig. 3), **1982.347** (♂ LV: Pl. **14**, 68, figs. 2, 3), **1982.348** (♂ LV: Pl. **14**, 66, fig. 1). All from Valentia, SW Ireland (approx. lat. 51° 55′ N, long. 10° 20′ W), taken from slides labelled "*B. constricta*" in the Norman Collection at the British Museum (Nat. Hist.); nos. **1982.345–347** are from slide **1900–3–6–379**, no. **1982.348** is from slide **1911.11.8 M3725**.

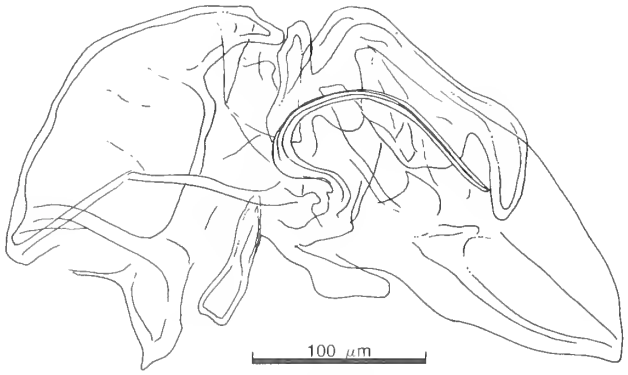
Diagnosis: Moderately large (750–850 μm long) species of *Bythocythere*; carapace moderately inflated, greatest width a little behind mid-length. Greatest height well behind mid-length. Dorsal margin convex in female, almost straight in male; ventral margin weakly sinuous in both sexes. Posterior margin denticulate. Dorsomedian sulcus weak. Male copulatory appendage with a relatively large, subtriangular distal process.

Explanation of Plate 14, 66

Fig. 1, ♂ LV, ext. lat. (**1982.348**, 840 μm long); figs. 2, 3, ♀ (**1982.346**, 810 μm long): fig. 2, LV, ext. lat.; fig. 3, RV, ext. lat. Scale A (100 μm; ×80), figs. 1–3.

Remarks: Early records of *B. constricta* Sars from British waters are now believed to be referable to either *B. intermedia* or *B. zetlandica* Athersuch, Horne & Whittaker, 1983 (see Horne, *Stereo-Atlas Ostracod Shells*, **14**, 69–72, 1987), neither of which possesses the deep median sulcus which is characteristic of Sars' species. *B. zetlandica* has a smooth posterior margin and is less elongate with a generally less rounded lateral outline than *B. intermedia*. A closely similar Miocene species, *B. neerlandica* Kuiper, 1918, is less elongate, less tapered anteriorly, and has a deeper dorsomedian sulcus than *B. intermedia*.

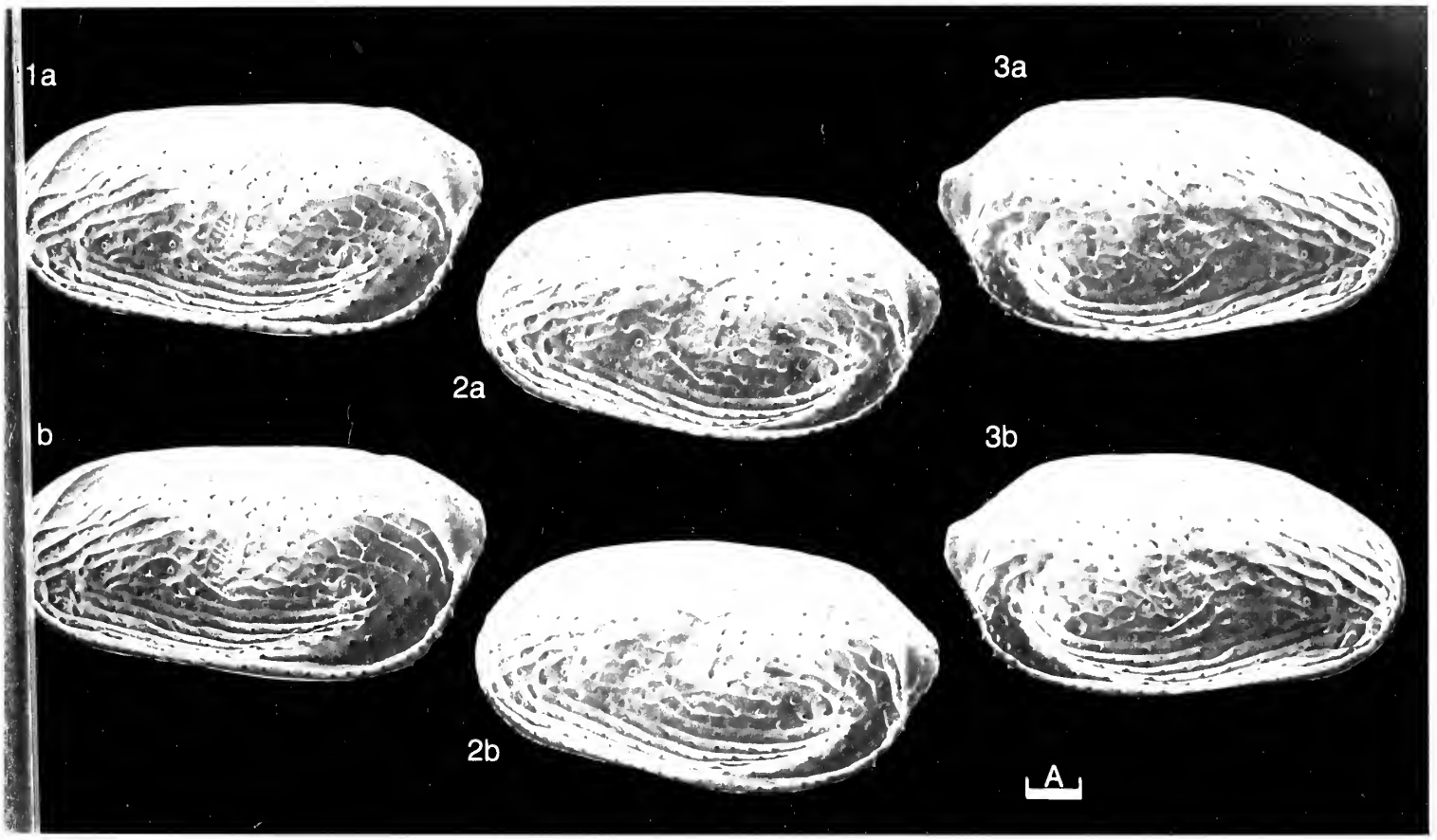
Distribution: Fairly common in sublittoral marine waters around British coasts, the southern North Sea, S Norway and Sweden, and as far south as the Bay of Biscay.



Text-fig. 1 *Bythocythere intermedia*, male copulatory appendage (**1982.345**).

Explanation of Plate 14, 68

Fig. 1, ♂ LV, dors. (**1982.345**, 820 μm long); figs. 2, 3, ♂ LV (**1982.347**, 790 μm long): fig. 2, int. lat.; fig. 3, central muscle scar field. Scale A (100 μm; ×80), figs. 1, 2; scale B (50 μm; ×400), fig. 3.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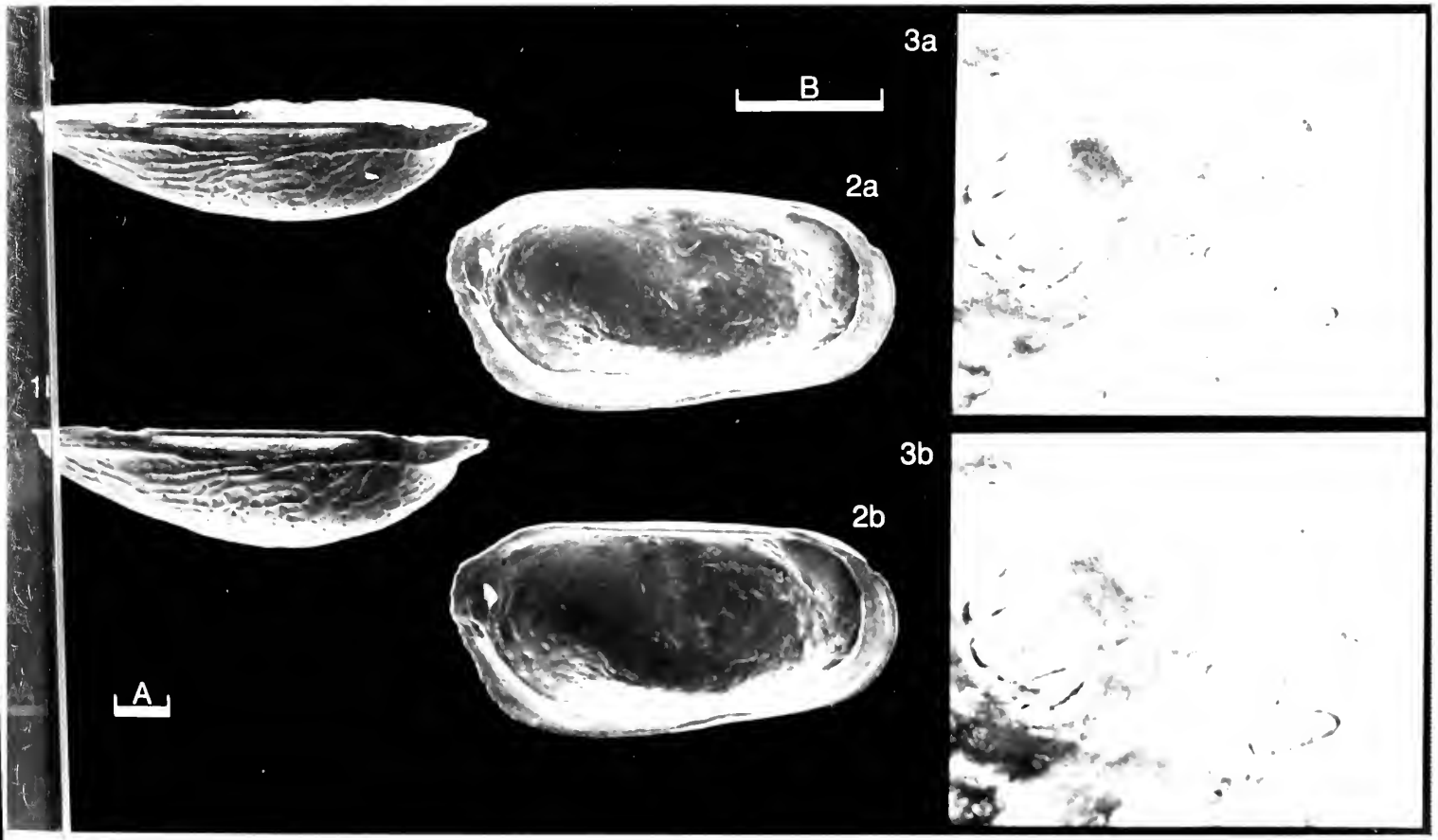
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595.337.14 (119.9) (411 : 162.002.61 + 415 : 162.011.51) : 551.351

ON *BYTHOCYTHERE ZETLANDICA* ATHERSUCH, HORNE & WHITTAKER

by David J. Horne
(Geology Dept, City of London Polytechnic)

Bythocythere zetlandica Athersuch, Horne & Whittaker, 1983

1868 *Bythocythere constricta* Sars; G. S. Brady, *Trans. Linn. Soc. Land.*, **26**, (*pars*), 451, pl. 35, fig. 47 only (*non* pl. 35, figs 48-52) (*non* Sars, 1866).

1983 *Bythocythere zetlandica* sp. nov. J. Athersuch, D. J. Horne & J. E. Whittaker, *J. micropalaeontol.*, **2**, 73, text-figs 41-n, 5c, pl. 2, figs 5-8.

Holotype: British Museum (Nat. Hist.) no. **1982.350**, ♀ carapace and appendages.
[Paratype, no. **1982.351**, ♂ carapace and appendages.]

Type locality: Unst Haaf (fishing grounds off Unst), Shetland, approx. lat. 61° 00′N, long. 1° 30′W; Recent, marine, sublittoral.

Figured specimens: British Museum (Nat. Hist.) nos. **1982.350** (holotype, ♀ LV: Pl. **14**, 70, fig. 2; RV: Pl. **14**, 70, fig. 3), **1982.351** (paratype, ♂ LV: Pl. **14**, 70, fig. 1), **1982.352** (♂ LV: Pl. **14**, 72, fig. 1; copulatory appendage: Text-fig. 1), **1982.353** (♂ LV: Pl. **14**, 72, figs 2-3). All taken from slides labelled "*B. constricta*" in the Norman Collection at the British Museum (Nat. Hist.): the holotype and paratype are from slide no. **1900-3-6-379**; nos **1982.352** and **1982.353**, both from Valentia, SW Ireland (approx. lat. 51° 55′N, long. 10° 20′W), are from slides **1900-3-6-379** and **1911.11.8. M3725** respectively.

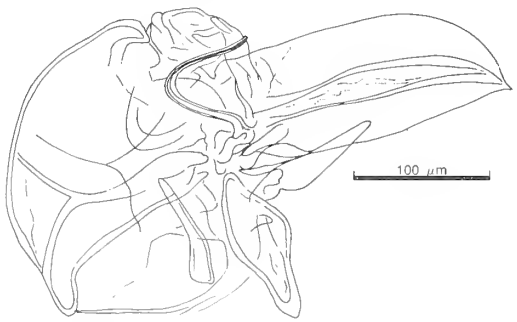
Explanation of Plate 14, 70

Fig. 1, ♂ LV, ext. lat. (paratype, **1982.351**, 770 μm long); figs. 2, 3, ♀ (holotype, **1982.350**, 790 μm long): fig. 2, LV, ext. lat.; fig. 3, RV, ext. lat.
Scale A (100 μm; × 80), figs 1-3.

Diagnosis: Moderately large (750-800 μm long) species of *Bythocythere*; carapace strongly inflated, greatest width a little behind mid-length. Dorsal and ventral margins virtually straight, converging anteriorly, greatest height well behind mid-length. Posterior margin smooth. Dorsomedian sulcus weak. Distal process of male copulatory appendate relatively long, with a convex anterior margin and an almost straight posterior margin.

Remarks: *B. zetlandica* was formerly confused with *B. constricta* Sars, which does not live in British waters; Sars' species has a characteristically deep dorsomedian sulcus, and the distal process of its male copulatory appendage is more symmetrical and slender than that of *B. zetlandica*. A similar NW European species, *B. intermedia* Elofson, 1938 (see Horne, *Stereo-Atlas Ostracod Shells* **14**, 65-68, 1987), is more elongate than *B. zetlandica* and has a denticulate posterior margin and a more rounded outline in lateral view.

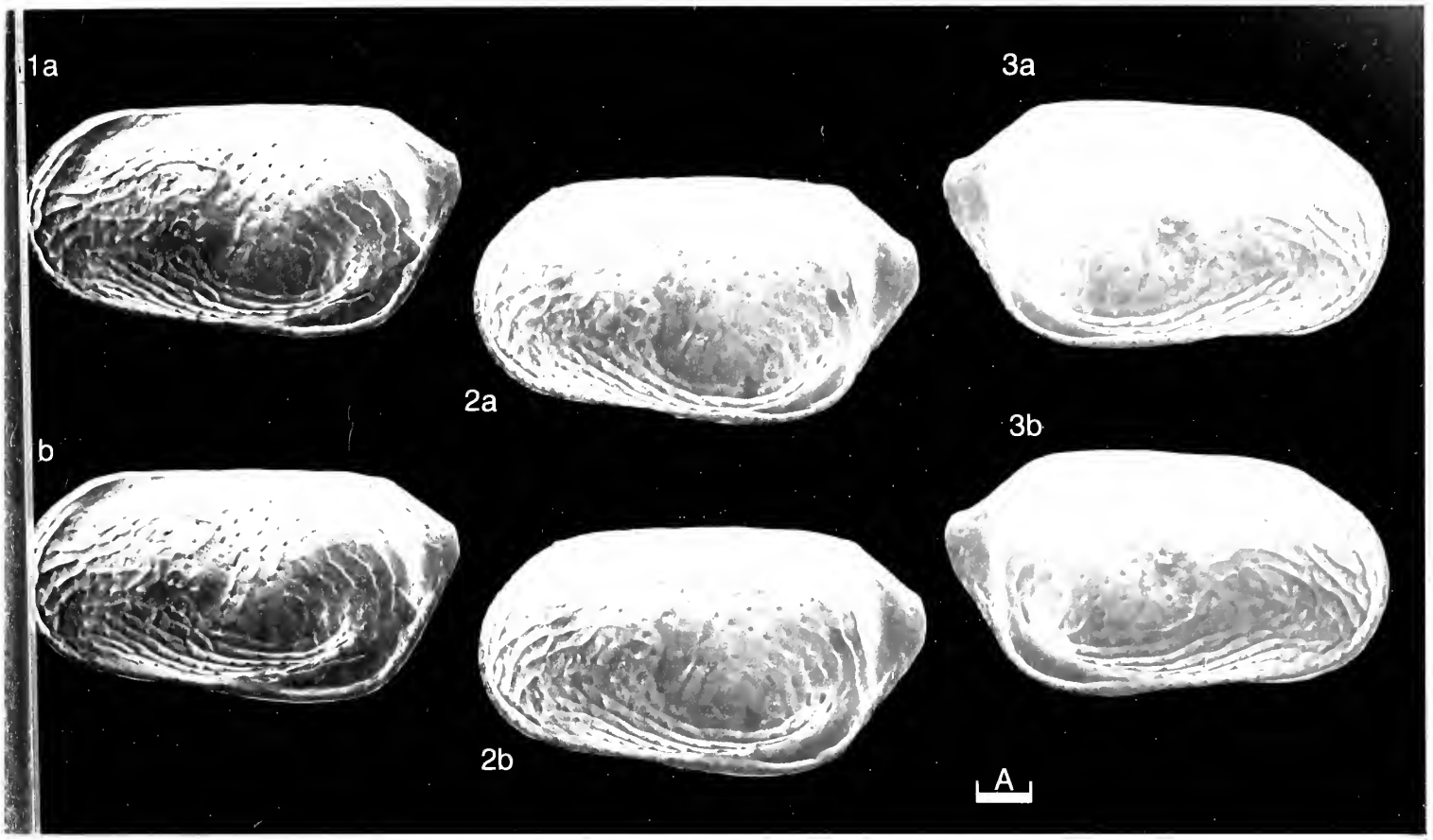
Distribution: A marine species found in sublittoral waters around British coasts, particularly in the north.



Text-fig. 1 *Bythocythere zetlandica*, male copulatory appendage (**1982.352**).

Explanation of Plate 14, 72

Fig. 1, ♂ LV, dors. (**1982.352**, 800 μm long); figs 2, 3 ♂ LV (**1982.353**, 780 μm long): fig. 2, int. lat.; fig. 3, central muscle scar field.
Scale A (100 μm; × 80), figs 1, 2; scale B (50 μm; × 400), fig. 3.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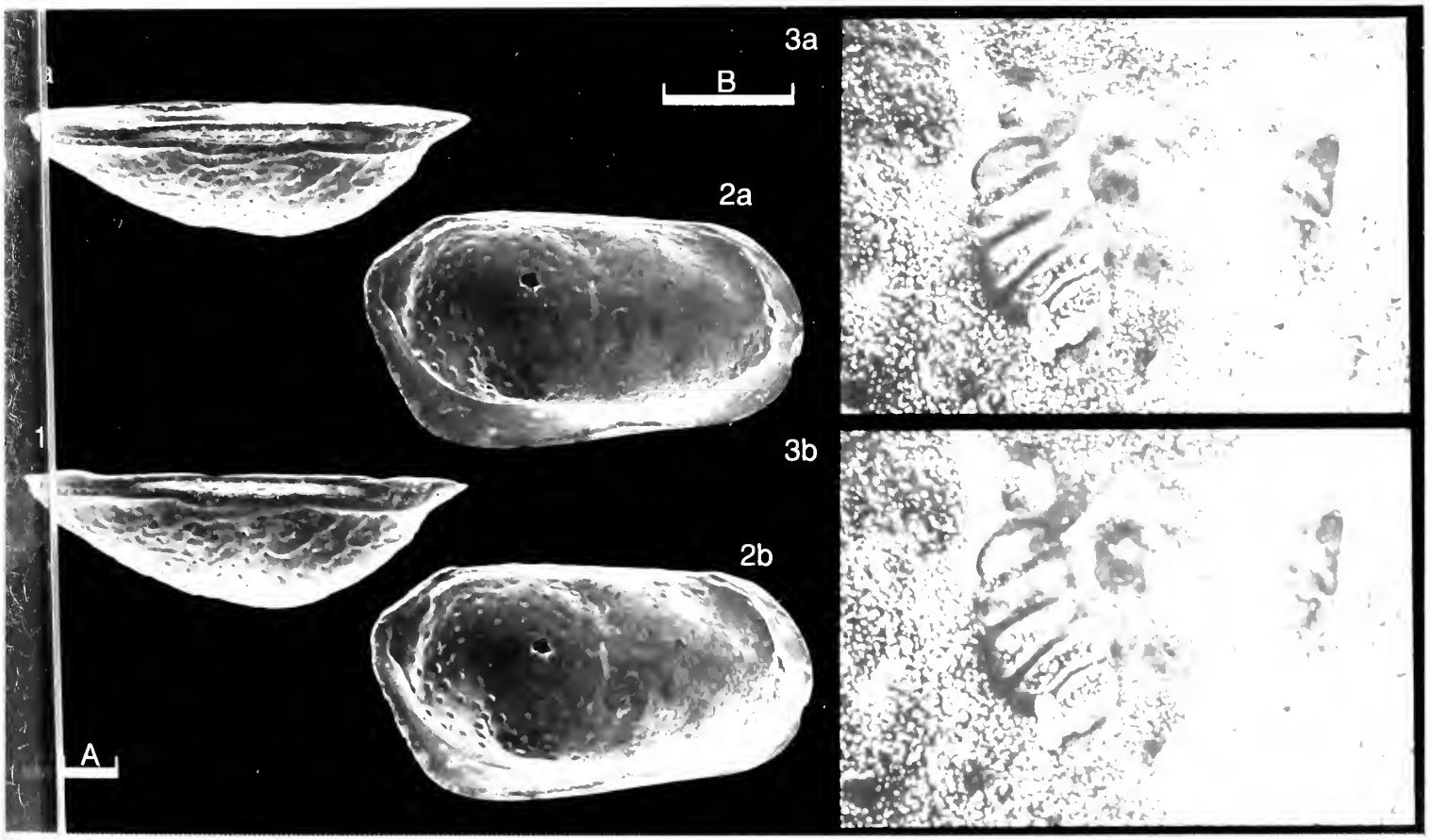
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Stereo-Atlas of Ostracod Shells: Vol. 14, Part 1

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A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, D. J. Horne, J. W. Neale,
and David J. Siveter

Volume 14, Part 2; 30th November, 1987

Published by the British Micropalaeontological Society, London

BP

Instructions to Authors

Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the majority of papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

Financial support from The British Petroleum Company p.l.c. for the publication of this issue is gratefully acknowledged.

The front cover shows a left valve of *Neolimnocythere hexaceros* Delachaux, 1928, from Quaternary Deposits at Lago Junin, Peru. Photograph by Dr P. De Deckker, University of Monash, Victoria, Australia.

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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *KUIPERIANA ROBUSTA* WHATLEY & MAYBURY sp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Kuiperiana robusta sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12976,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12977, OS 12978**].

Type locality: Blue Clay, sample no. 29, NW corner of Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the robust nature of the valves.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12976** (holotype, ♀ LV: Pl. **14,** 74, fig. 1; Pl. **14,** 76, fig. 2), **OS 12977** (paratype, ♀ RV: Pl **14,** 74, fig. 2; Pl. **14,** 76, figs. 1, 3, 4), **OS 12978** (paratype, ♂ LV: Pl. **14**, 74, fig. 3). All from the type locality and horizon.

Explanation of Plate 14, 74

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12976,** 550 μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12977,** 560 μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12978,** 550 μm long).
Scale A (100 μm; × 104), figs. 1–3.

Diagnosis: Medium-sized, strongly dimorphic with circular to subcircular, regularly disposed punctae medianly and reticulae peripherally. Dorsomedianly with 3 short, inclined sulcate depressions. Posterior marginal rim narrow and alar process bluntly rounded. Eye tubercle inconspicuous. Inner lamella moderately wide, undulose posteroventrally with a wide ventral flange and selvage and list developed. Hinge gongylodont with a long, thin, smooth groove/bar medianly; the posterior terminal element of the right valve is a curved tooth with a frill-like dorsal surface.

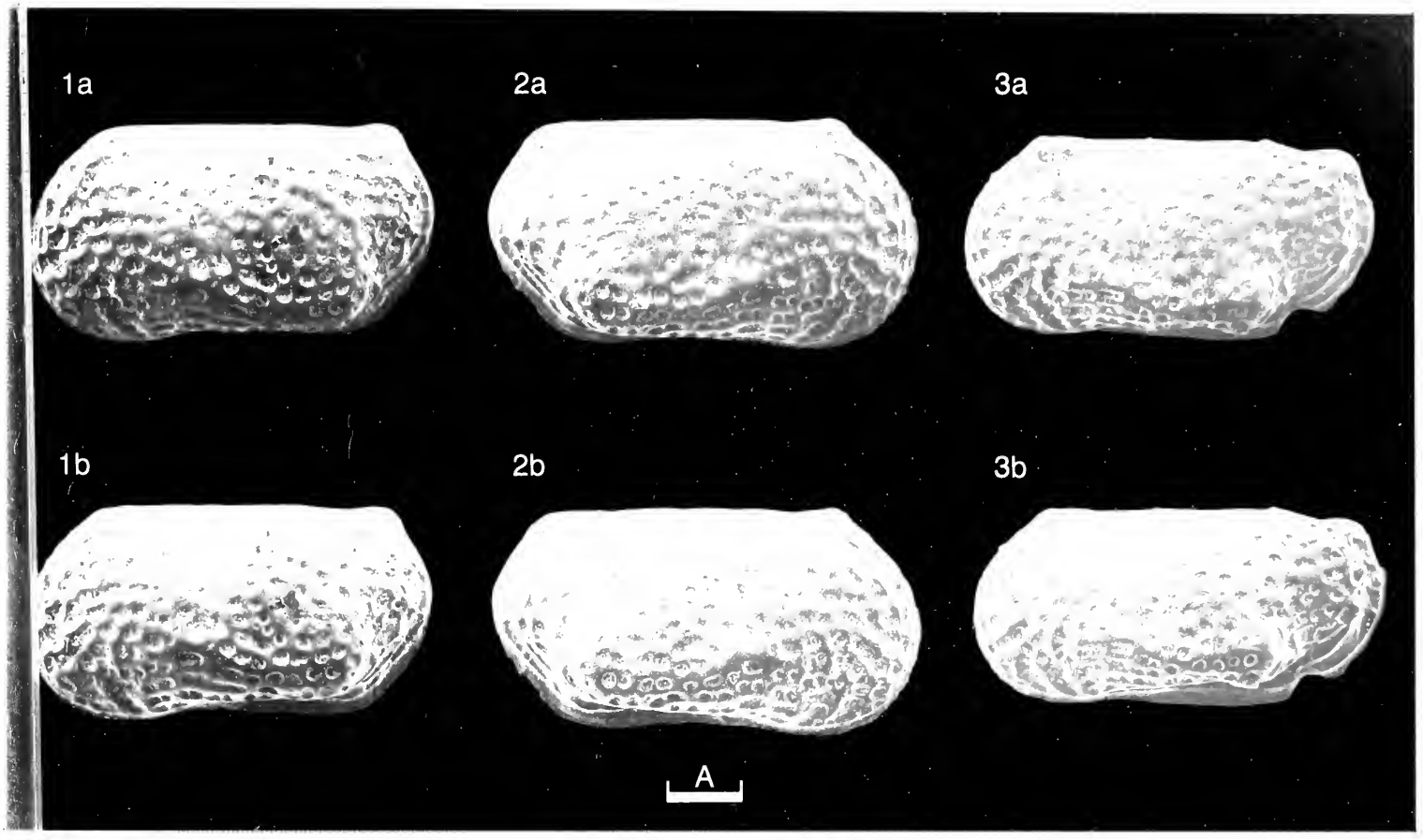
Remarks: This species differs from the type-species, *K. wanneri wanneri* (Kuiper, 1918) (W. N. Kuiper, *Oligocäne und Miocäne Ostracoden aus den Niederlanden,* publ. PhD thesis, Groningen, 26–27, pl. 1, figs. 8a–c, 1918 and M.A.A. Bassiouni, *Roemeriana,* **3,** 62–66, pl. 8, figs. 1–3, 1962) in that its reticulae are less regularly ordered ventrally, its eye tubercle is difficult to distinguish from ornament (whereas it is well defined in *K. wanneri wanneri*) and it possesses an alar process. (*K. wanneri wanneri* is inflated ventrally, but lacks a clearly defined alar protuberance). Both species possess punctate and reticulate ornament and have elongate, subrectangular lateral outlines.

The ratio of adult to juvenile specimens of *K. robusta* in the authors' material is low (1:43), with only 5 adult specimens recovered.

Distribution: Upper Pliocene deposits of St. Erth, England (sample nos. 1–4, 7, 11, 16, 18, 22–23, 25–29) and Upper Pliocene (Redonian) deposits of Apigné (Borehole II, Le Temple du Cerisier), Le Bosq d'Aubigny and Saint-Jean-la-Poterie (sample no. 1549.15); NW France. See C. Maybury (*Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France,* unpubl. PhD thesis, Univ. Wales, **1,** 3–29, 1985) and J. –P. Margerel (*Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 8–26, 1968) for geographical, stratigraphical and sample details.

Explanation of Plate 14, 76

Figs. 1, 3, 4, ♀ RV (paratype, **OS 12977,** 560 μm long): fig. 1, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element; fig. 2, ♀ LV, int. lat. (holotype, **OS 12976,** 550 μm long).
Scale A (100 μm; × 104), figs. 1, 2; scale B (40 μm; × 330), figs. 3, 4.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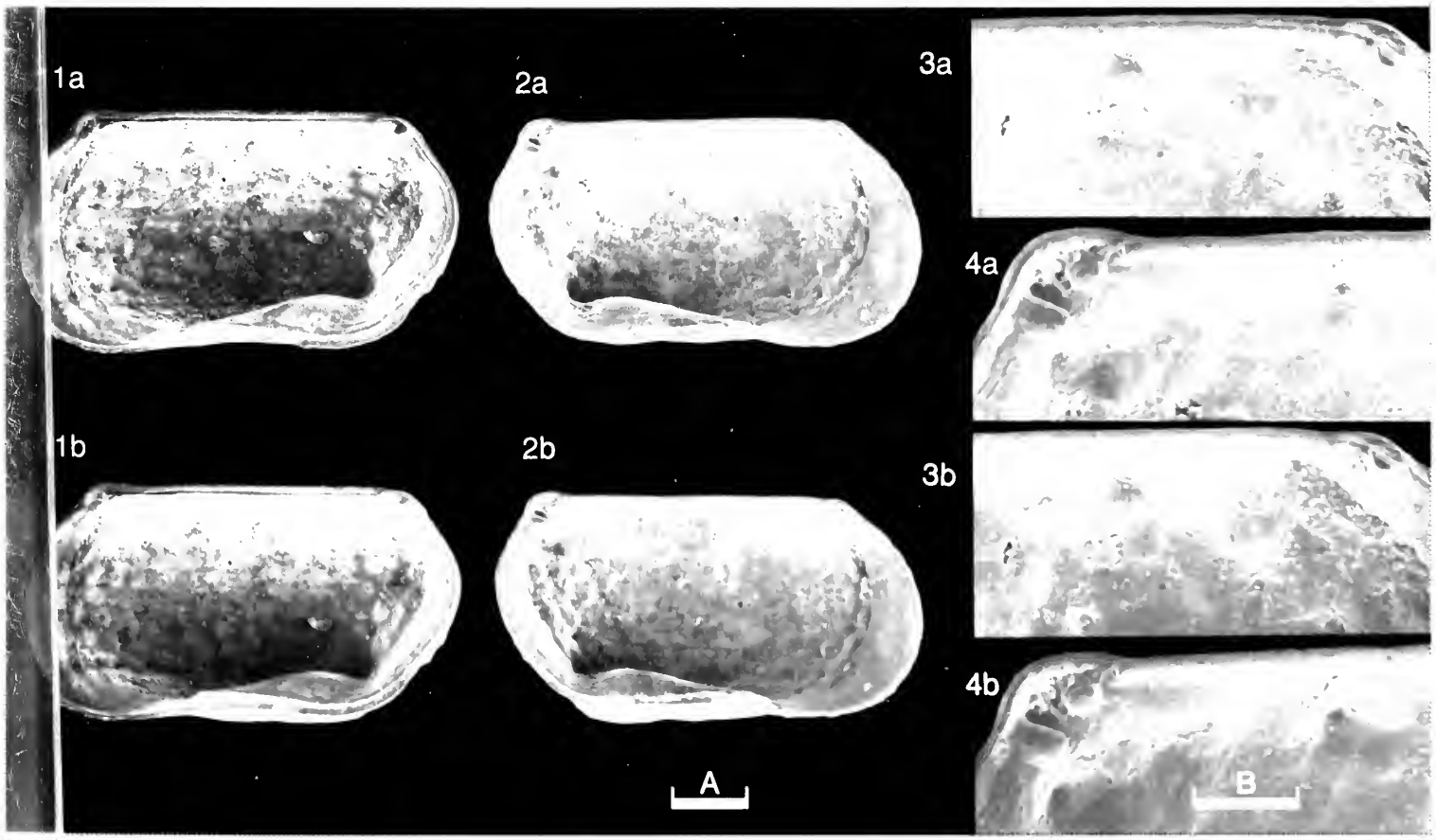
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3b
4b
A
B

595.337.14 (118.22) (420:162.006.50) : 551.351+552.52

ON *LOXOCAUDA SUBQUADRATA* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Loxocauda subquadrata sp. nov.

Holotype: British Museum (Nat. Hist.) no **OS 12906**, ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12907–OS 12909**].

Type locality: Blue Clay, sample no. 16, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the outline of the valves in lateral view.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12906** (holotype, ♀ LV: Pl. **14**, 78, fig. 1), **OS 12907** (paratype, ♀ RV: Pl. **14**, 78, fig. 2), **OS 12908** (paratype, ♂ LV: Pl. **14**, 78, fig. 3; Pl. **14**, 80, figs. 2–4), **OS 12909** (paratype, ♂ RV: Pl. **14**, 80, fig. 1). All from the type locality: specimen **OS 12907** is from Mottled Clean Clay (sample no. 2); specimen **OS 12908** is from a mixed sample (no. 7) and specimen **OS 12909** is from the same sample as the holotype. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, **1**, 3–6, 1985 for sample details.

Explanation of Plate 14, 78

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12906**, 380 μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12907**, 390 μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12908**, 430 μm long).
Scale A (100 μm; ×160), figs. 1–3.

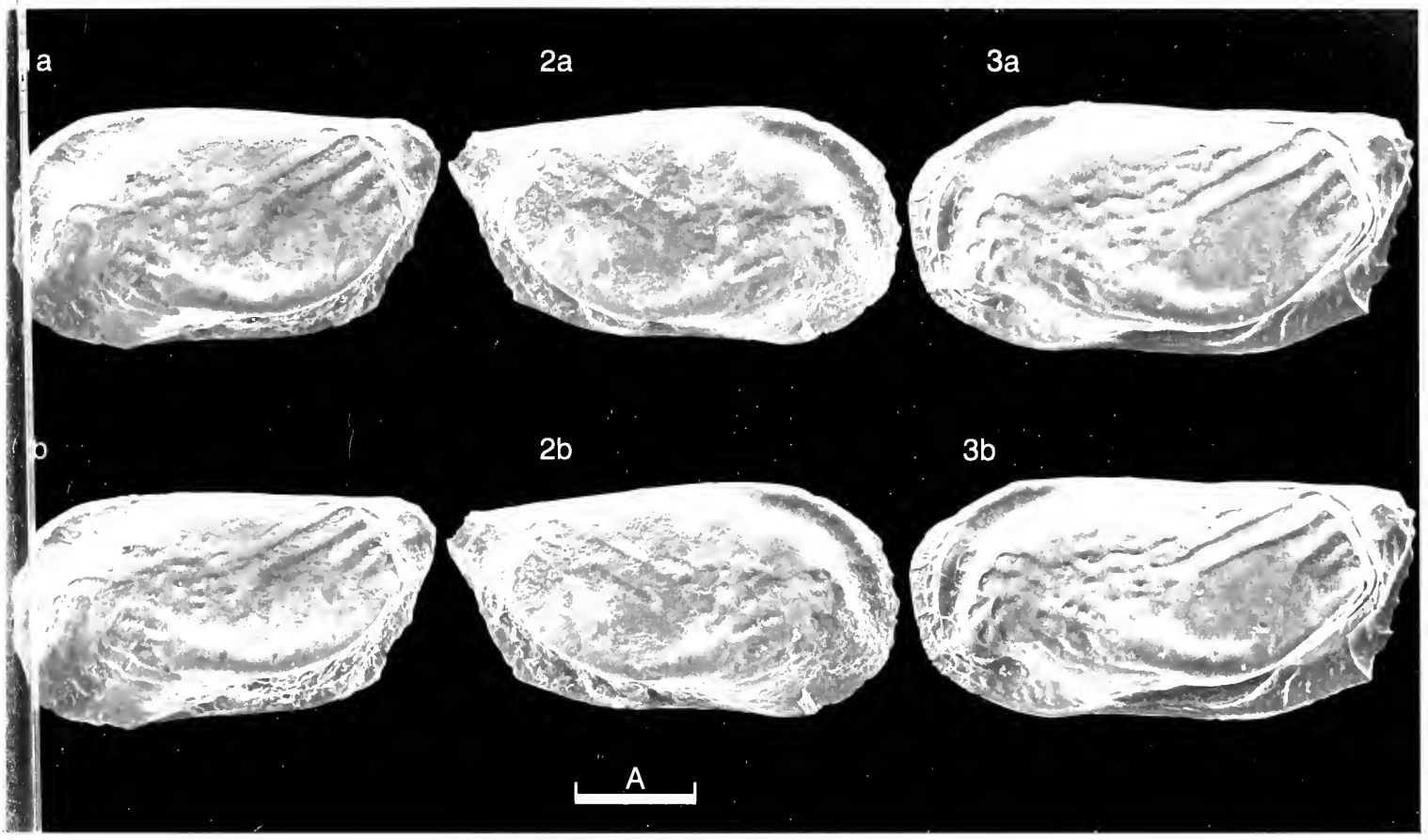
Diagnosis: A very small to small, subquadrate species of *Loxocauda* characterised by a lateral surface with 4 obliquely disposed ridges posterodorsally and traces of a reticulum anteromedianly and anteroventrally; remainder smooth. Free marginal areas strongly compressed with a prominent, curved, sub-alar process posteriorly and posteroventrally. Hinge unusual: comprising in the left valve, a smooth bar with its anterior and posterior ends enclosed by narrow, horizontal, "u"-shaped sockets themselves bounded by "u"-shaped ridges. Muscle scars comprising four contiguous adductors, a "v"-shaped frontal and two subcircular mandibular scars.

Remarks: The genus *Loxocauda* is known only from three previously described species: the type-species, *L. muelleri* Schornikov, 1969 (*in*: F. D. Mordukhai-Boltovskoi, (Ed.) *Identification Key to the Fauna of the Black and Azov Seas*, *2*, 201, pl. 28, fig. 1, Kiev, 1969), *L. fragilis* (Sars, 1866) (G. O. Sars, *Forh. Vidensk Selsk. Krist.*, **1865**, 65–66, 1866 and *An account of the Crustacea of Norway*, **9**, *Ostracoda*, pts. 13, 14, 222, pl. 102, fig. 3, 1926) and *L. decipiens* (G. W. Müller, 1894) (G. W. Müller, *Fauna Flora Golf. Neapel*, **21**, 347–348, pl. 27, figs. 10–14, 24, pl. 29, figs. 2, 9, 1894). All these species differ from the new species in that they lack the traces of a reticulum and the sub-alar process which are characteristic of *L. subquadrata*. The present species (and all known *Loxocauda* species) resemble *Pseudocythere* Sars in shape and outline. The two genera differ, however, in their musculature, hingement and appendages.

Distribution: The species is known only from the Upper Pliocene deposits of St. Erth, Cornwall, England (samples nos. 1–4, 7, 16, 21, 23, 25–28, C. Maybury, *op. cit.*).

Explanation of Plate 14, 80

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12909**, 400 μm long); figs. 2–4, ♂ LV, (paratype, **OS 12908**, 430 μm long): fig. 2, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element.
Scale A (100 μm; ×160), figs. 1, 2; scale B (40 μm; ×400), figs. 3, 4.


a
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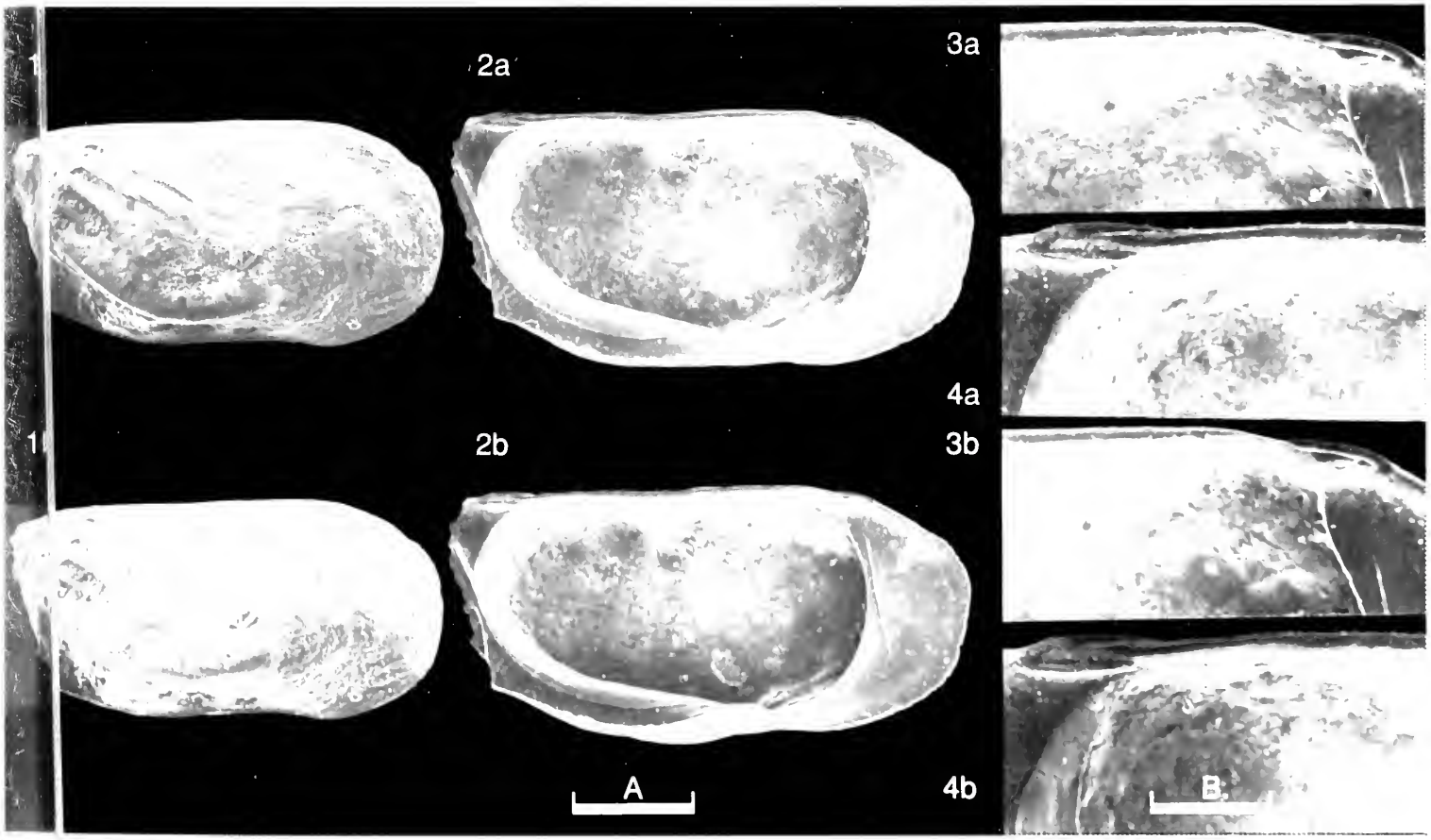
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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE MINUTA* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Sagmatocythere minuta sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12849,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12850 – OS 12853**].

Type locality: Mixed sample, sample no. 7, Vicarage Pit. St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, referring to the very small size of the species.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12849** (holotype, ♀ LV: Pl. **14,** 82, fig. 1), **OS 12850** (paratype, ♀ RV: Pl. **14,** 82, fig. 2), **OS 12852** (paratype, ♂ RV: Pl. **14**, 82, fig. 3), **OS 12851** (paratype, ♂ LV: Pl. **14,** 84, fig. 1), **OS 12853** (paratype, ♀ RV: Pl. **14,** 84, fig. 2), **OS 12854** (paratype, ♂ LV: Pl. **14,** 84, fig. 3). Specimens **OS 12850** and **OS 128854** from the same sample as the holotype; the remaining paratypes from Brown Clay (sample no. 28) at the type locality. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, **1,** 3–6, 1985 for sample details.

Explanation of Plate 14, 82

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12849,** 370μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12850,** 370μm long); fig. 3, ♂ RV, ext. lat. (paratype, **OS 12852,** 380μm long).
Scale A (100μm; × 161), figs. 1–3.

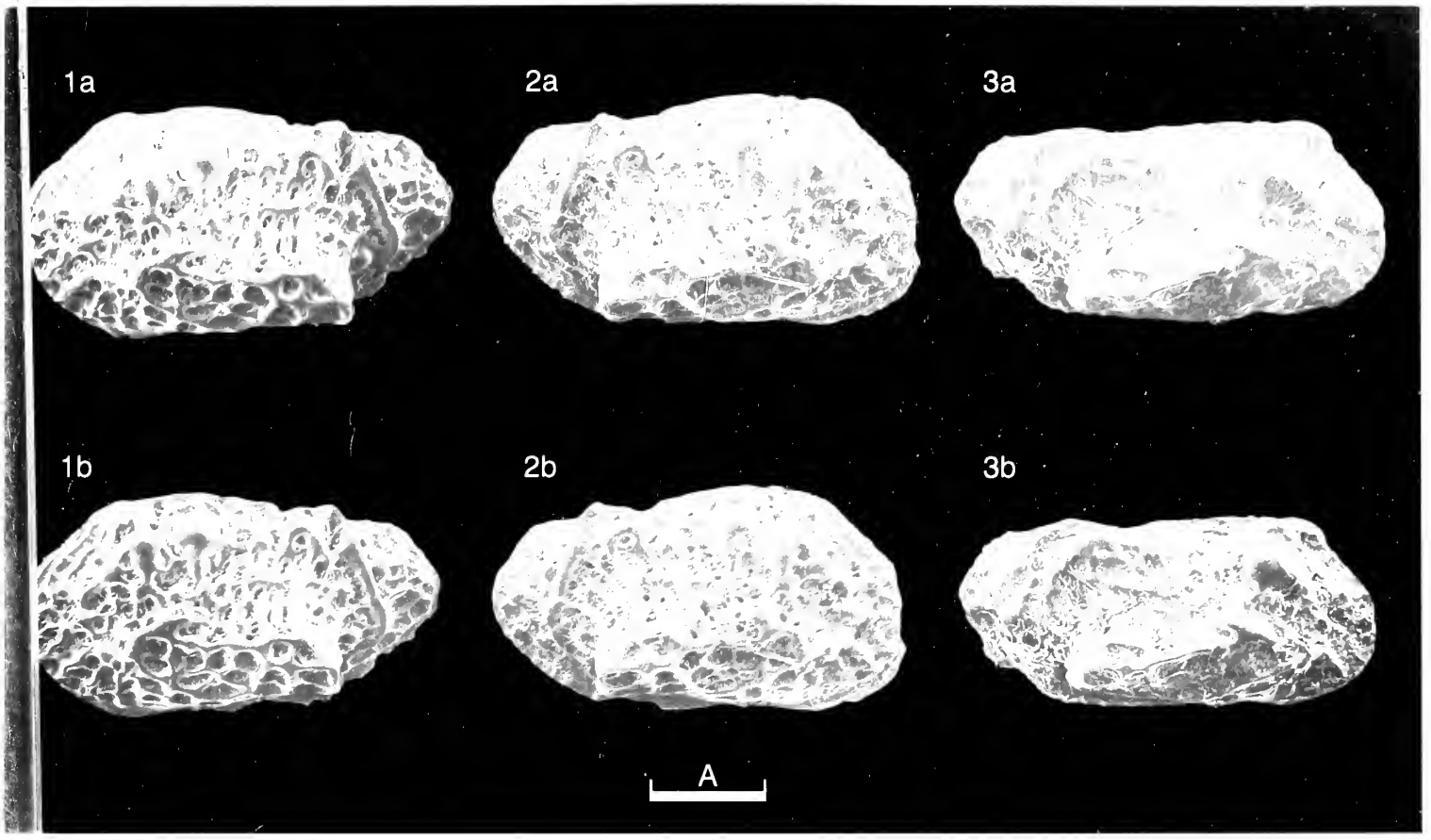
Diagnosis: A very small, strongly dimorphic, alate species of *Sagmatocythere* with a complex ornament of nodes and reticulae. In females there are two anterodorsal nodes, in males only one; their position is reflected internally by shallow circular to subcircular depressions. The anterior of the two anterodorsal nodes in the female and the anterodorsal node of the male is situated below the eye tubercle and is connected to it by a smooth rib. Posterodorsal node well defined and bearing a prominent, inverted u-shaped dorsal loop. Selvage well developed and blade-like mid-ventrally.

Remarks: This species, *Sagmatocythere alaefortis alaefortis* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 85–88, 1987) and *S. alaefortis gallica* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 89–92, 1987) form a distinct group of *Sagmatocythere* whose noded and irregularly reticulate ornament distinguishes them from the "*napoliana*" and "*multifora*" groups. The "*napoliana*" group comprises *S. napoliana* (Puri, 1963) (see J. Athersuch, *Stereo-Atlas Ostracod Shells,* **3,** 117–124, 1976), *S. cristatissima* (Ruggieri, 1967) (*Riv. ital. Paleont. Stratigr.,* **73,** 374–376, figs. 37–38) and *S. wyatti* Maybury & Whatley, 1987 (*Stereo-Atlas Ostracod Shells,* **14,** 93–96). These strongly reticulate species all possess muri which are narrow and almost "blade-like". The "*multifora*" group comprises *S. multifora* (Norman, 1865) (*In:* G. S. Brady, *Nat. Hist. Trans. Northumberland and Durham,* **1,** 18–19, pl. 6, figs. 13–16), *S. littoralis* (G. W. Müller, 1894) (*Fauna Flora Golf. Neapel* **21,** 346, pl. 27, fig. 9, pl. 29, figs. 1, 7), *S. paracercinata* Whatley & Maybury, 1984 (*Stereo-Atlas Ostracod Shells,* **11,** 21–24) and *S. pseudomultifora* Maybury & Whatley, 1984 (*Stereo-Atlas Ostracod Shells,* **11,** 25–28). Species of this group are alate and possess regular reticulate ornament. The small size of the adults of *S. minuta* make it the smallest *Sagmatocythere* yet recorded.

Distribution: The species has been recovered from the Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos 1–4, 7, 16, 18, 23, 25–28) and the Upper Pliocene (Redonian) deposits of Apigné (Le Temple du Cerisier), NW France. (See C. Maybury, *op. cit.*, for sample details).

Explanation of Plate 14, 84

Fig. 1, ♂ LV, ext. lat. (paratype, **OS 12851,** 380μm long); fig. 2, ♀ RV, int. lat. (paratype, **OS 12853,** 370μm long); fig. 3, ♂ LV, int. lat. (paratype, **OS 12854,** 380μm long).
Scale A (100μm; × 161), figs. 1–3.


1a
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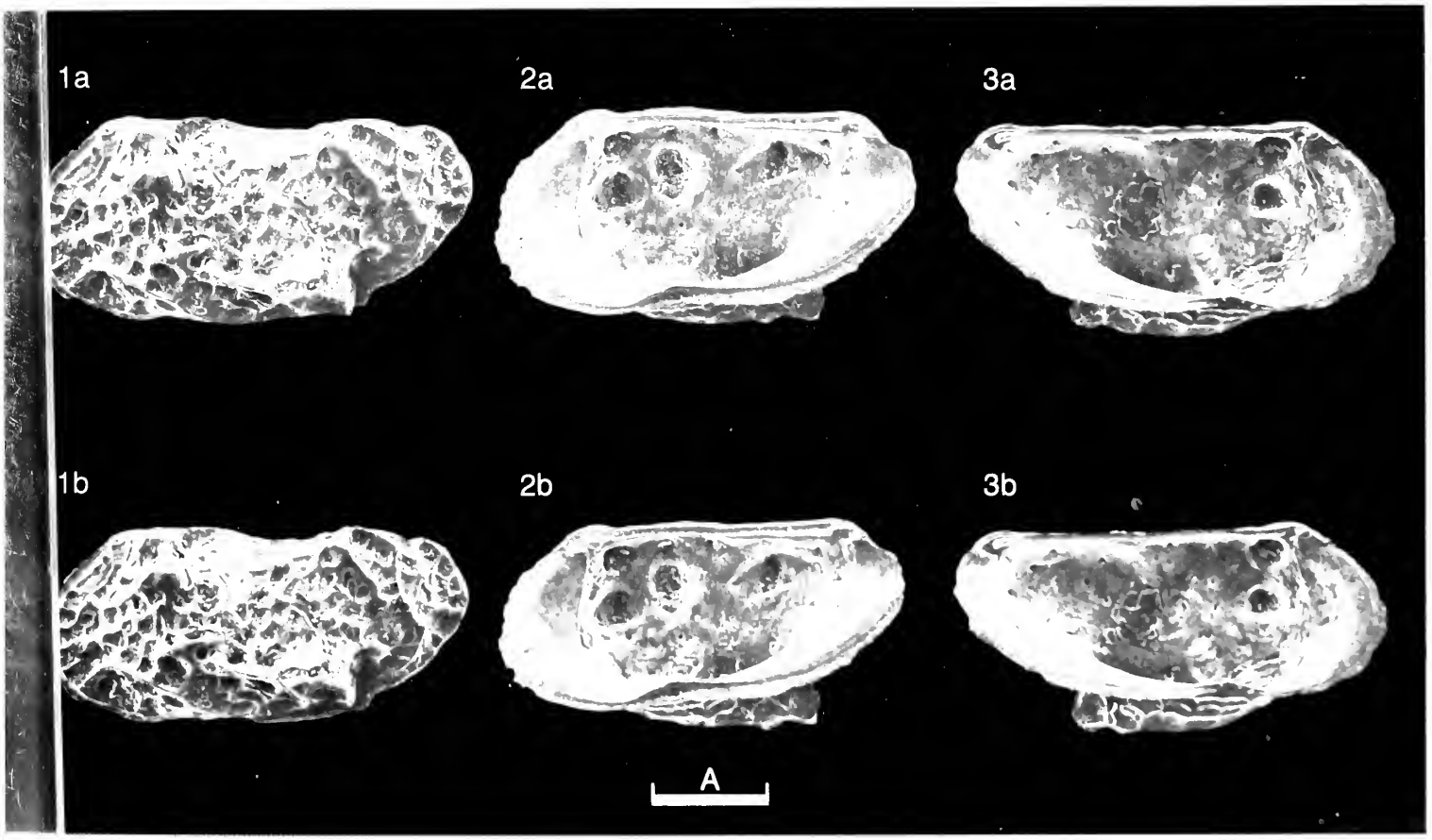
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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE ALAEFORTIS ALAEFORTIS* WHATLEY & MAYBURY sp. & subsp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Sagmatocythere alaefortis alaeforti sp. & subsp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12843**, ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12844–OS 12848**].

Type locality: Brown Clay, sample no. 28, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the strongly developed alae of this species.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12843** (holotype, ♀ LV: Pl. **14**, 86, fig. 1), **OS 12844** (paratype, ♀ RV: Pl. **14**, 86, fig. 2), **OS 12845** (paratype, ♂ LV: Pl. **14**, 86, fig. 3), **OS 12846** (paratype, ♂ RV: Pl. **14**, 88, fig. 1), **OS 12847** (paratype, ♀ RV: Pl. **14**, 88, fig. 2), **OS 12848** (paratype, ♂ LV: Pl. **14**, 88, fig. 3). Specimens **OS 12845**, **OS 12846** and **OS 12848** are from the same sample as the holotype. Specimen **OS 12844** is from a bulk sample (sample no. 1) and specimen **OS 12847** from a mixed sample; both are from the type locality and horizon. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, **1**, 3–6, 1985 for sample details.

Explanation of Plate 14, 86

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12843**, 450 μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12844**, 460 μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12845**, 500 μm long).
Scale A (100 μm; ×125), figs. 1–3.

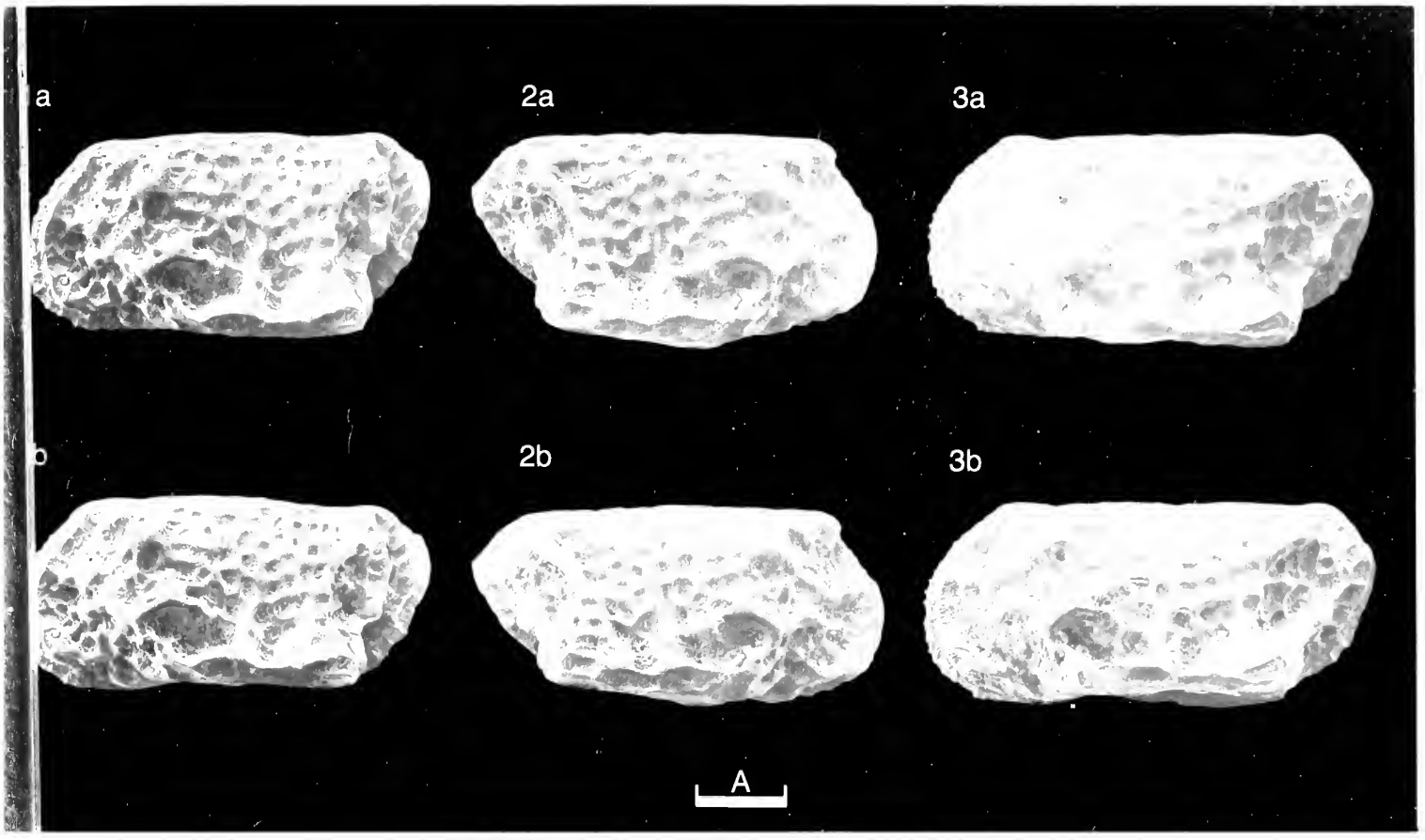
Diagnosis: A medium, subrectangular subspecies of *Sagmatocythere* with a straight dorsal margin and strongly developed alae. Anterior and posterior marginal areas flattened and with ornament less well developed. Reticulate mid-dorsally and dorsomedianly. Ribs massive and angular in the alar region of the valve with two deep depressions midventrally. Eye tubercle irregular in outline and connected with a subrounded, anterodorsal node. Thickened ribs in the posterodorsal area of the female and male left valve assume a more noded character in the male right valve.

Remarks: The posterodorsal protuberance/node and irregularly reticulate ornament of this species is similar to that of certain species of *Loxocorniculum* Benson & Coleman, 1963 (*Paleont. Contr. Univ. Kansas.*, no. 31, 38) such as the type-species, *L. fischeri* (Brady, 1869) (*In*: L. De Folin & L. Périer (eds.), *Les Fonds de la Mer*, **1**(1), 154, pl. 18, figs. 15–16, 1869). The present authors, however, differentiate the two genera on the basis of their hinge structure: species of *Sagmatocythere* possessing a gongylodont hinge with a smooth median element and species of *Loxocorniculum* a gongylodont hinge with a strongly denticulate median element.

Distribution: Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos. 1–4, 7, 11, 21, 23, 25–29; see C. Maybury, *op. cit.*, **1**, 3–6 for sample details).

Explanation of Plate 14, 88

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12846**, 500 μm long); fig. 2, ♀ RV, int. lat. (paratype, **OS 12847**, 450 μm long); fig. 3, ♂ LV, musc. sc. (paratype, **OS 12848**, 500 μm long).
Scale A (100 μm; ×125), figs. 1, 2; scale B (10 μm; ×700), fig. 3.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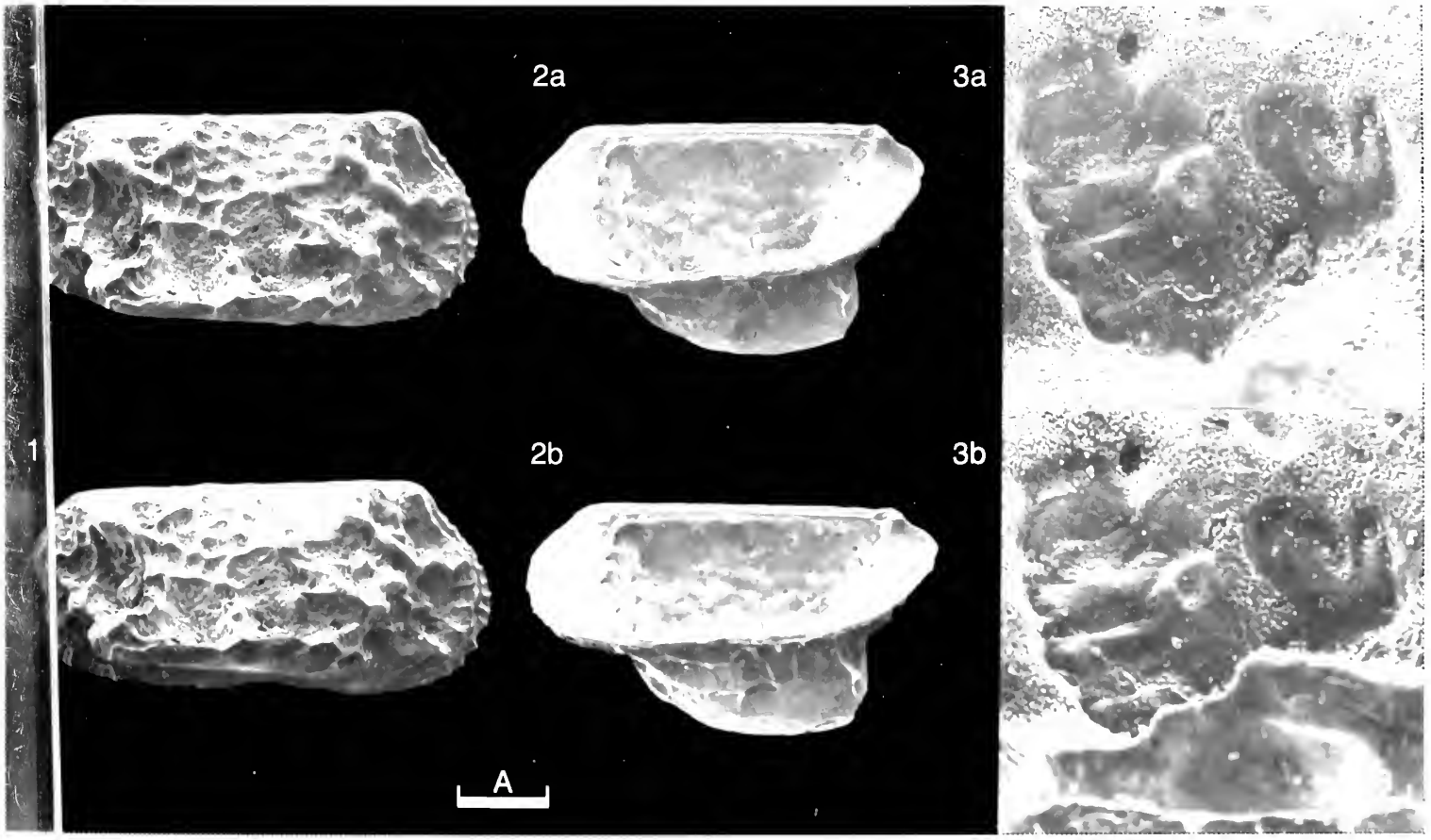
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595.337.14 (118.22) (40 : 162.002.48) : 551.351 + 552.51

ON *SAGMATOCYTHERE ALAEFORTIS GALLICA* WHATLEY & MAYBURY subsp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Sagmatocythere alaefortis gallica subsp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12839,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12840 – OS 12842**].

Type locality: Shell-rich sand, Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07′N, long. 1° 41′W), NW France; Upper Pliocene, Redonian.

Derivation of name: Latin, referring to the fact that the subspecies has only been found in the Redonian deposits of France.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12839** (holotype, ♀ LV: Pl. **14,** 90, fig. 1), **OS 12840** (paratype, ♀ RV: Pl. **14,** 90, fig. 2), **OS 12841** (paratype, ♂ LV: Pl. **14**, 90, fig. 3), **OS 12842** (paratype, ♂ RV: Pl. **14,** 92, figs. 1–4). All from the type locality and horizon.

Explanation of Plate 14, 90

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12839,** 430μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12840,** 440μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12841,** 480μm long).
Scale A (100μm; × 135), figs. 1–3.

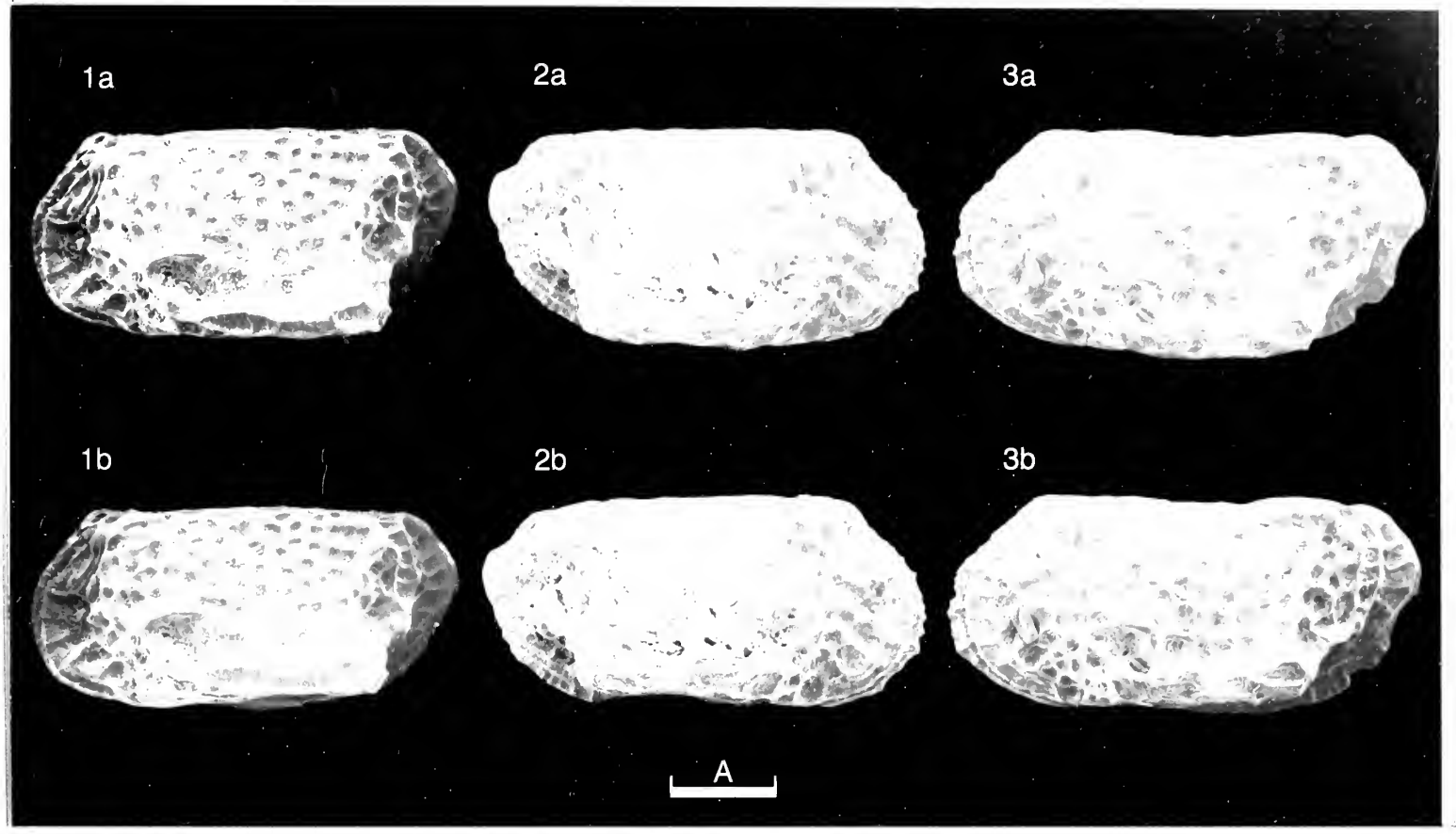
Diagnosis: A small subspecies of *Sagmatocythere* characterised by a straight dorsal margin in female specimens and a slightly concave dorsal margin in males. The ornament is regularly reticulate with the majority of fossae circular to suboval in outline. Fossae of the alar region of the valve are comparatively large and have irregular, angular outlines. In the left valve there is a prominent, posterodorsal loop; this is less prominent in the right valve. Inner lamella broad with a conspicuous, blade-like selvage ventrally.

Remarks: *Sagmatocythere alaefortis gallica* differs from *S. alaefortis alaefortis* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 85–88, 1987) in its smaller size and by having a greater portion of its lateral surface covered by a reticulum. The reticulum is also more regular in *S. alaefortis gallica* than in the nominate subspecies and the posterodorsal protuberance of *S. alaefortis alaefortis* is reduced to a posterodorsal loop in *S. alaefortis gallica.* The distinctive, blade-like selvage of *S. alaefortis gallica* also serves to distinguish it from *S. alaefortis alaefortis.*

Distribution: This subspecies occurs in the Redonian (Upper Pliocene) deposits of Apigné (Le Temple du Cerisier) and of Falleron (approx. lat. 46° 60′N; long. 1° 41′W). It has also been recovered in a mixed sample from NW France, also of Redonian age. See J. –P. Margerel, *Les Foraminifères du Redonian. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 8–26, 1968 for geographical, stratigraphical and sample details.

Explanation of Plate 14, 92

Fig. 1–4, ♂ RV (paratype, **OS 12842,** 460μm long): fig. 1, ext. lat; fig. 2, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element.
Scale A (100μm; × 135), figs. 1, 2; scale B (40μm; × 265), figs. 3, 4.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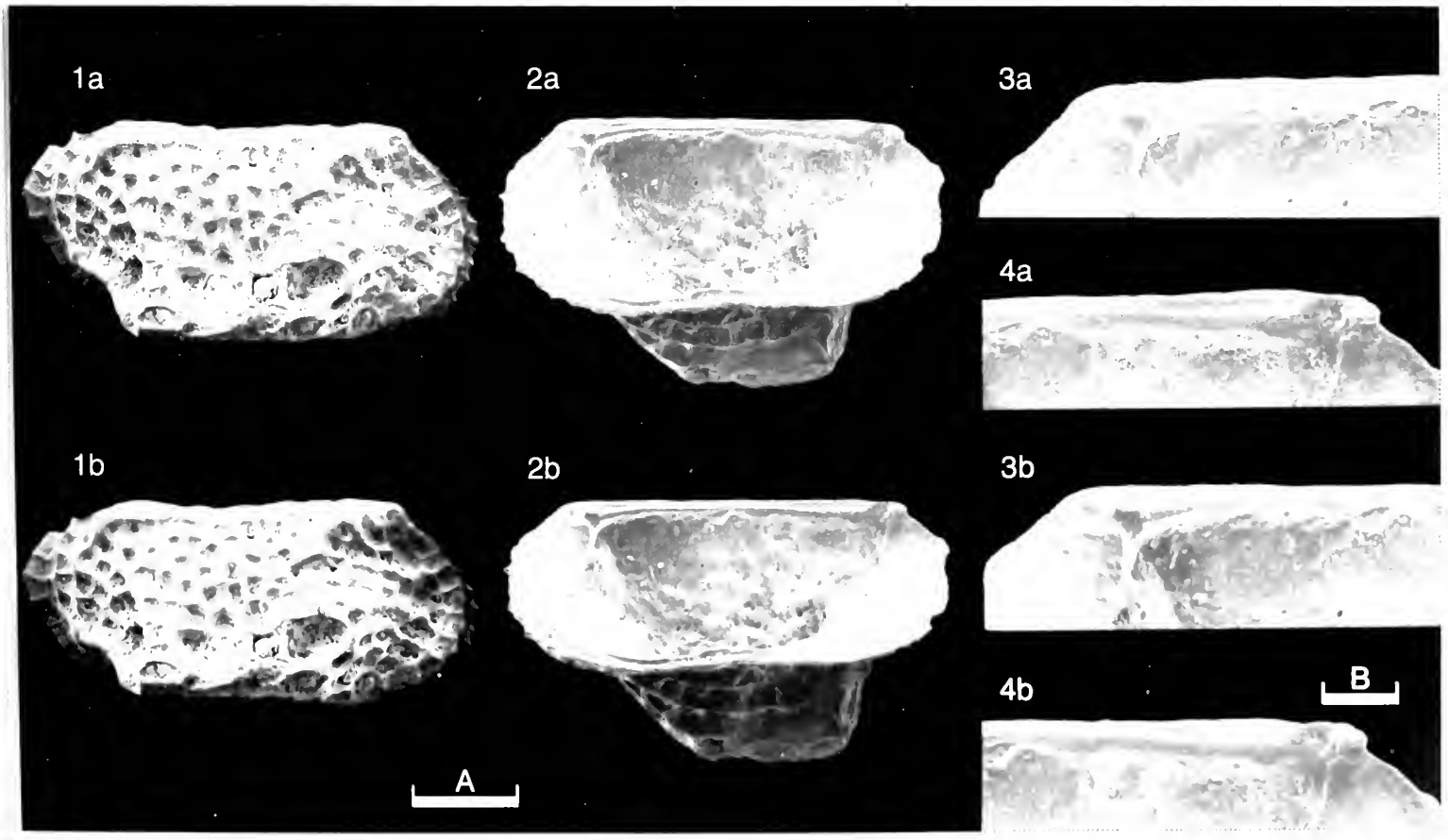
A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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE WYATTI* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Sagmatocythere wyatti sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12861,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12862 – OS 12865**].

Type locality: Mixed sample, sample no. 7, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, in honour of Mr. Antony Wyatt in recognition of his work on 'wobbling continents'.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12861** (holotype, ♀ LV: Pl. **14,** 94, fig. 1), **OS 12862** (paratype, ♂ LV: Pl. **14,** 94, fig. 2), **OS 12863** (paratype, ♂ RV: Pl. **14**, 94, fig. 3), **OS 12864** (paratype, ♂ RV: Pl. **14,** 96, figs. 1, 3, 4), **OS 12865** (paratype, juv. LV: Pl. **14,** 96, fig. 2). All specimens from the type locality; **OS 12863** and **OS 12865** are from the same sample as the holotype, but **OS 12862** is from a sample of blue clay (no. 25) and **OS 12864** from a mixed sample (no. 1). See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France,* unpub. PhD thesis, Univ. Wales, **1,** 3–6, for sample details.

Explanation of Plate 14, 94

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12861,** 500μm long); fig. 2, ♂ LV, ext. lat. (paratype, **OS 12862,** 460μm long); fig. 3, ♂ RV, ext. lat. (paratype, **OS 12863,** 470μm long).
Scale A (100μm; × 127), figs. 1–3.

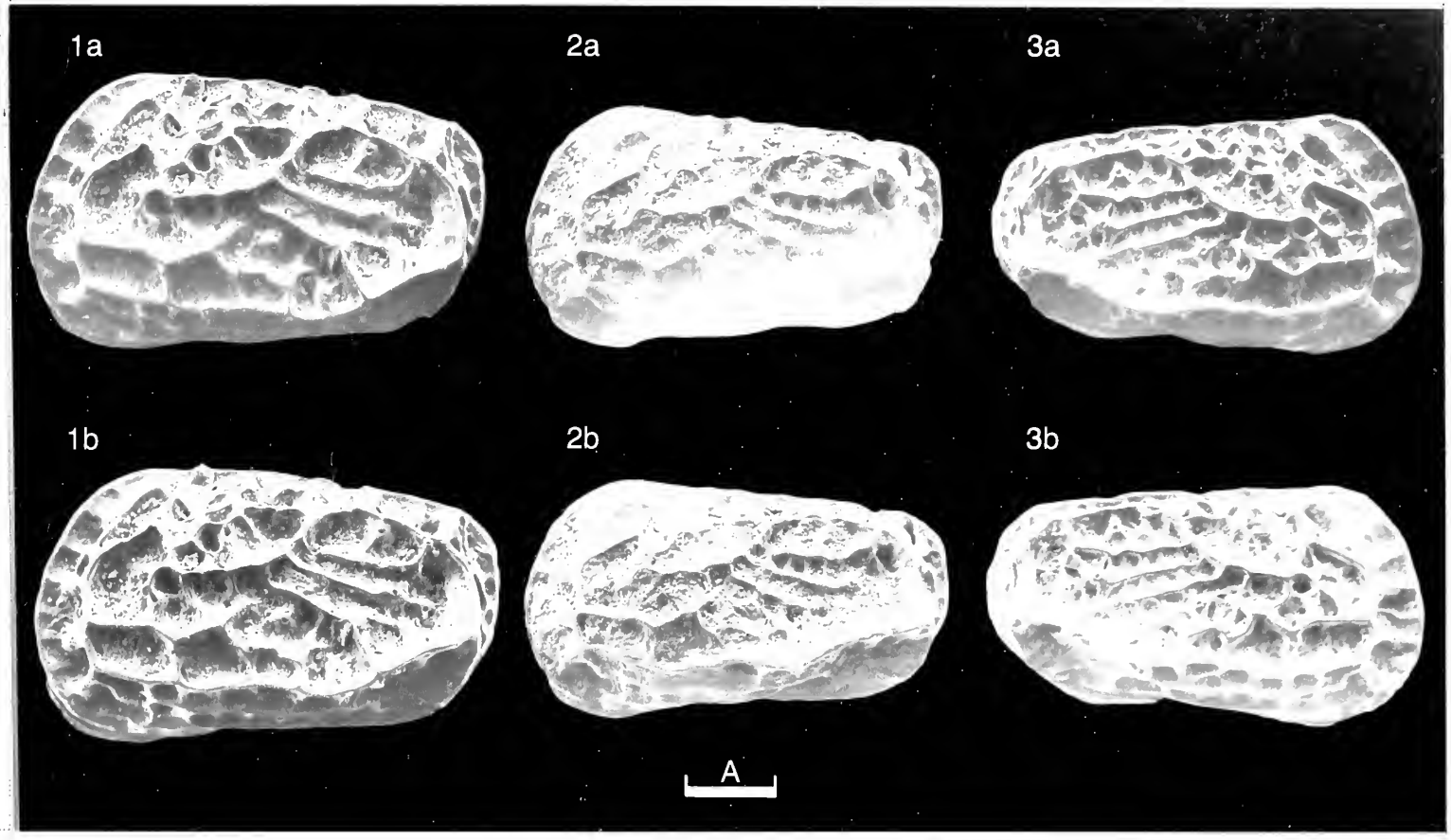
Diagnosis: A small to medium species of *Sagmatocythere* with an irregularly reticulate ornament of large fossae and narrow, blade-like muri. There are four obliquely disposed, subparallel muri posteriorly and a deeply excavated area posteroventrally. Eye tubercle small, smooth, tear-shaped and connecting with a narrow murus which extends anteroventrally, parallel to the anterior margin.

Remarks: This species and the type-species, *Sagmatocythere napoliana* (Puri, 1963) (see J. Athersuch, *Stereo-Atlas Ostracod Shells* **3,** 117–124, 1976), a Miocene to Recent Mediterranean species, are similar in that certain units or 'cells' of the reticulum can be traced in both species. There is, for example, a prominent, polygonal posterior unit and a deeply excavated posteroventral area. In addition, there are 5–7 conjunctive pore conuli anteriorly, the muri of both species are narrow and blade-like and the fossae comparatively large. The two species differ in lateral outline; *S. napoliana* is much more elongate than *S. wyatti* and, whereas the former species has a dorsal margin with a concavity or 'saddle', the dorsal margin of *S. wyatti* is straight and obliquely sloped.

Distribution: In addition to its occurrence in the Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos. 1, 7, 10, 23, 25, 28–29; see C. Maybury, *op. cit.,* for details), this species has been found in a Redonian (Upper Pliocene) sample of shell-rich sand from Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07′N, long. 1° 41′W), NW France (see, J. –P. Margerel, *Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 7–13, 1968 for further sample details).

Explanation of Plate 14, 96

Figs. 1, 3, 4, ♂ RV (paratype, **OS 12864,** 460μm long): fig. 1, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element; fig. 2, juv. LV, musc. sc. (paratype, **OS 12865,** 410μm long).
Scale A (100μm; × 127), fig. 1; scale B (10μm; × 740), fig. 2; scale C (40μm; × 330), figs. 3, 4.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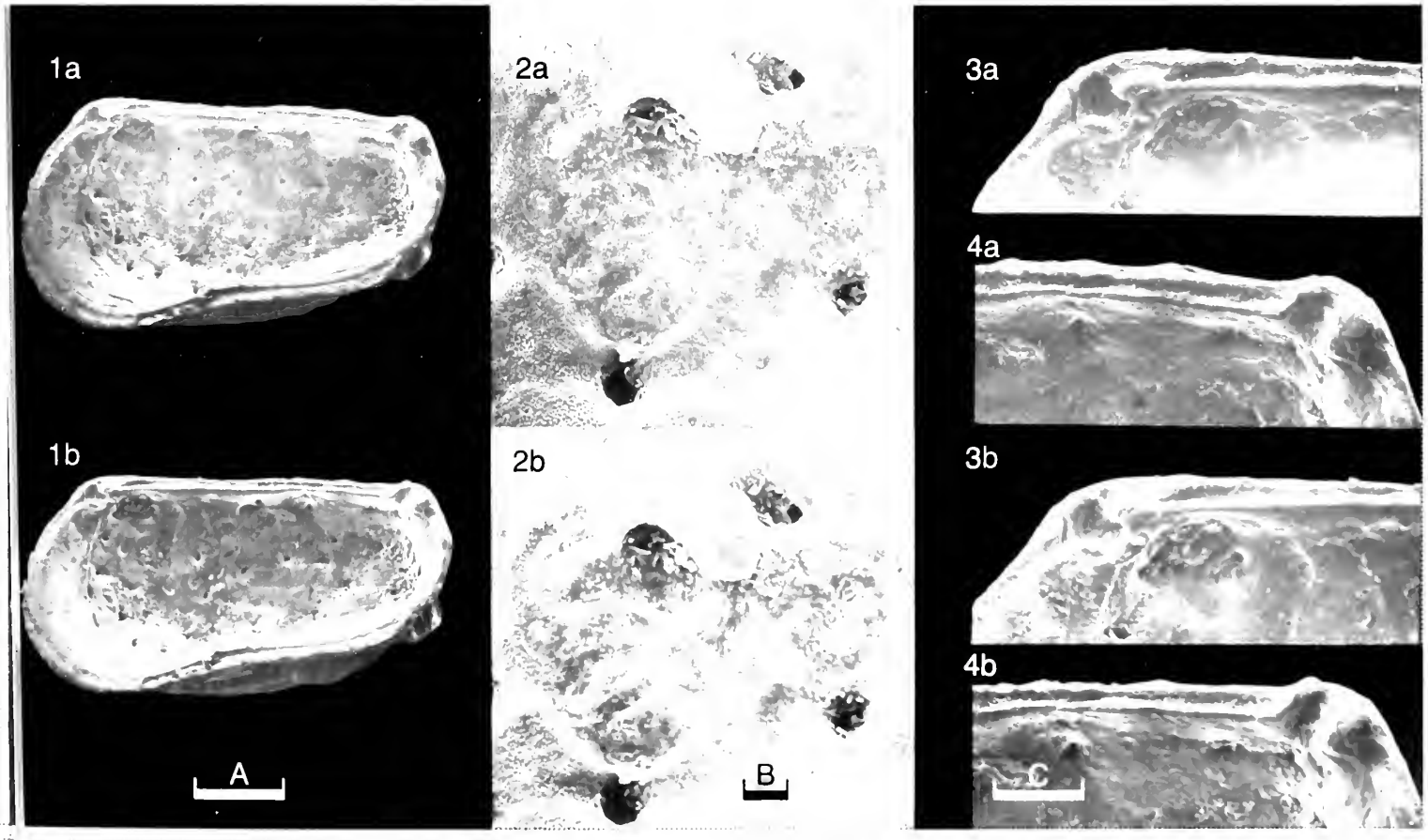
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4a
3b
4b
C

595.337.14 (118.22.+119.9) (45:161.009.45+261.268 : 162.004.50+411 : 162.002.61+411 : 162.006.55+496.1 : 161.026.38) : 551.351

ON *CARINOCYTHEREIS CARINATA* (ROEMER)

by John Athersuch & John E. Whittaker
(B.P. Research Centre, Sunbury and British Museum (Natural History), London)

Genus *CARINOCYTHEREIS* Ruggieri, 1956
Type-species (by original designation): *Cytherina carinata* Roemer, 1838

Diagnosis: Quadrate trachyleberid with three subparallel ponticulate, sometimes discontinuous carinae; ventral carina strongest. Ventral margin carinate; anterior margin carinate and/or denticulate; posterior margin spinose or denticulate; area between carinae tuberculate or mammilate. Male RV dimorphic; posteroventral region of valve devoid of ventral carina and compressed. Eye tubercle prominent. Hinge amphidont or heterodont; anterior tooth of RV stepped; posterior tooth crenulate.

Seta of second podomere of antennula long in both sexes; endopodite of antenna with three long setae; exopodite dimorphic, long and three-jointed in male, short and possibly only two-jointed in female.

Remarks: *Carinocythereis* differs from *Occlusacythere* Ruggieri & Russo, 1980, in possessing ponticulate carinae.

Expanation of Plate 14, 98

Fig. 1, ♀ car., ext. lt. lat. (**1984.180**, 1050 μm long); fig. 2, ♀ RV, ext. lat. (**1984.181**, 1020 μm long); fig. 3, ♂ RV, ext. lat. (**1984.182**, 1000 μm long).
Scale A (250 μm; ×60), figs. 1–3.

Carinocythereis carinata (Roemer, 1838)

1838 *Cytherina carinata* sp. nov. F.A. Roemer, *Neues Jb Miner. Geogn. Geol. Petrefakt.*, **1838**, 518, pl. 6, fig. 28.
1850 *Cythereis antiquata* sp. nov. W. Baird, *Natural History of British Entomostraca*, Ray Soc., London, 176, pl. 20, fig. 2.
1868 *Cythere antiquata* (Baird); G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, 417, pl. 30, figs. 17–20.
1960 *Carinocythereis antiquata* (Baird); F. E. Caraion, *Revue Biol. Buc.*, **5**, 123, figs. 4a, b.
1980 *Carinocythereis carinata* Roemer; G. Ruggieri & A. Russo, *Boll. Soc. paleont. ital.*, **19**, 30, pl. 2, fig. 8; text-fig. 2 (neotype).
1981 *Carinocythereis antiquata* (Baird); N. Doruk, *Stereo-Atlas Ostracod Shells*, **8**, 63–70.

Neotype: Designated by Ruggieri & Russo, *op. cit.*, a female RV; housed in the Institute of Palaeontology, University of Modena, Italy, cat. no. **19252**. (Refigured herein, Pl. **14**, 100, fig. 1). The original type material of *C. carinata* is missing (only label exists) from the Roemer Collection, Roemer Museum, Hildesheim, West Germany (Athersuch & Whittaker, 1986, *Br. Micropalaeontologist*, **29**, 9).

Type locality: Castellarquarto, Piacenza, N Italy (approx. lat 45°00′N, long. 9°40′E); Late Pliocene.

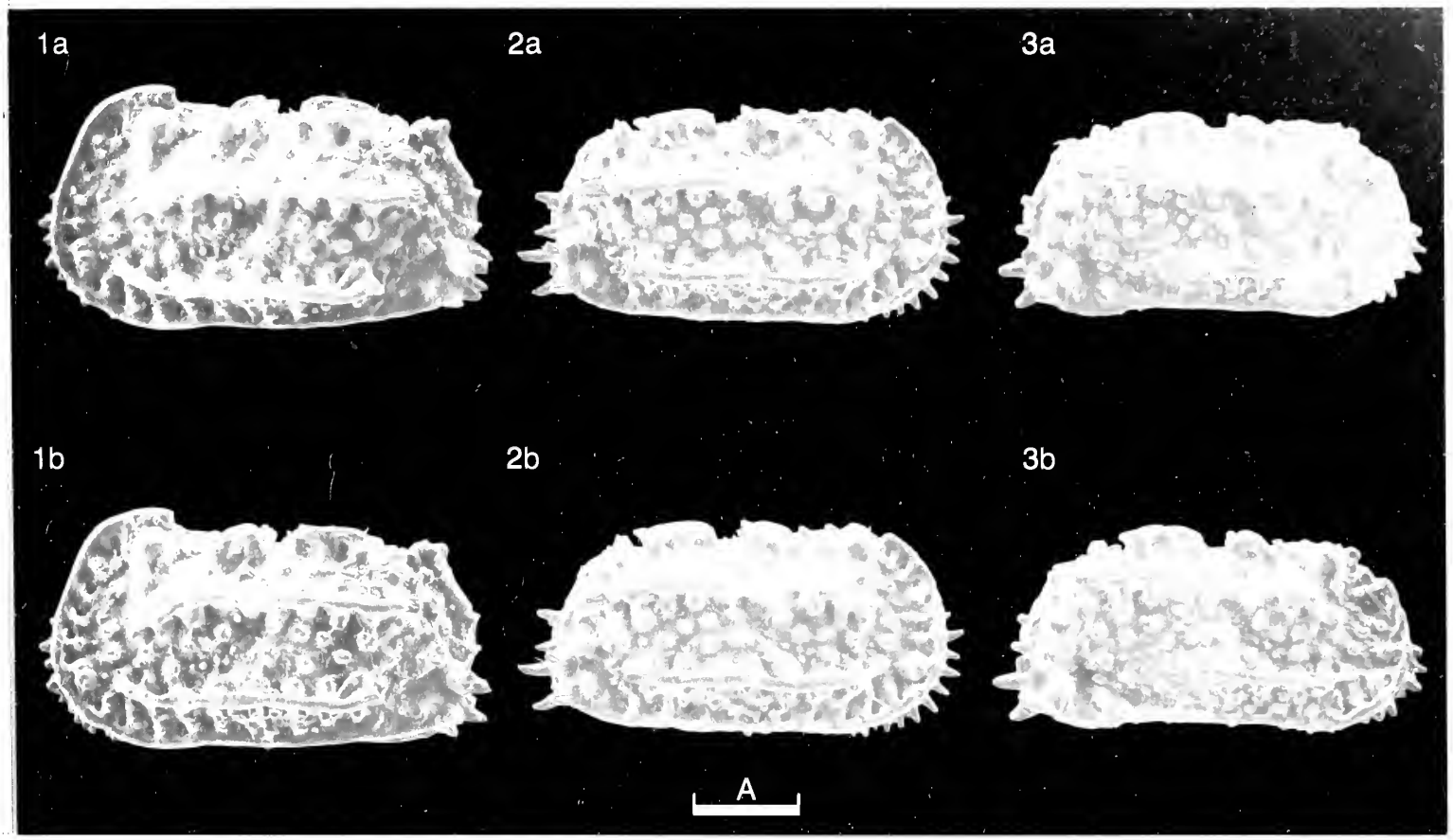
Figured specimens: British Museum (Nat. Hist.) nos. **1984.180** (♀ car.: Pl. **14**, 98, fig. 1; Pl. **14**, 100, fig. 3), **1984.181** (♂ RV: Pl. **14**, 98, fig. 2), **1984.182** (♂ RV: Pl. **14**, 98, fig 3). **Io 5884** (♂ LV: Pl. **14**, 100, fig. 2), **1984.212** (♂ copulatory appendage: Text-fig. 1).

Institute of Palaeontology, University of Modena, no. **19252** (neotype, ♀ RV: Pl. **14**,100, fig. 1).

1984.180 is from between Plymouth Sound and Start Point, Devon, SW England (lat. 50°10′N, long. 4°00′W), collected at depth of 38m by S. J. Sturrock. **1984.181**, **182** are from Unst Haaf (fishing grounds), Shetland (approx. lat. 61°00′N, long. 1°30′W), *ex.* Norman Collection slide no. **1900.3.6.268**, collected 1867. **Io 5884** is from Urla Bay, W Turkey (approx. lat. 38°19′N, long. 26°47′E), collected by N. Doruk (and figured by her (1981, *op. cit.*) as "*C. antiquata* (Baird)"). **1984.212** is from Rothesay Bay, Isle of Bute (approx. lat. 55°50′N, long. 5°05′W), SW Scotland, ex Brady Collection. All Recent. University of Modena no. **19252**, from type locality; Late Pliocene.

Explanation of Plate 14, 100

Fig. 1, ♀ RV, ext. lat. (Neotype, Univ. of Modena no. **19252**, 820 μm long); fig. 2, ♂ LV, ext. lat. (**Io 5884**, 960 μm long); fig. 3 ♀ car., ext. vent. (**1984.180**).
Scale A (250 μm; ×60), figs. 1–3.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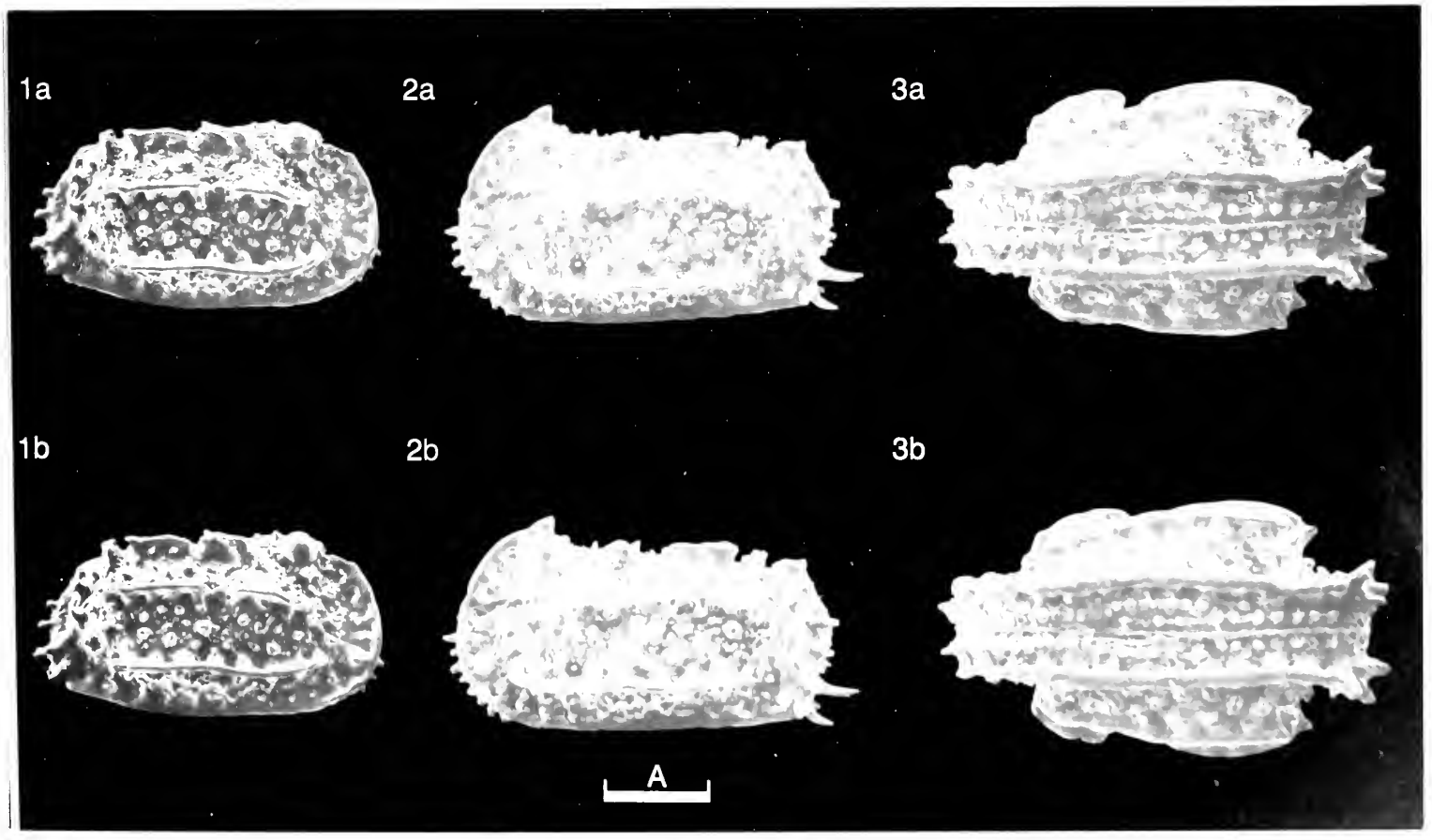
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Diagnosis: Anterior margin with marginal carina which is entire and ponticulate throughout. Ventrolateral carina not produced anteriorly. Male copulatory appendages distinctive.

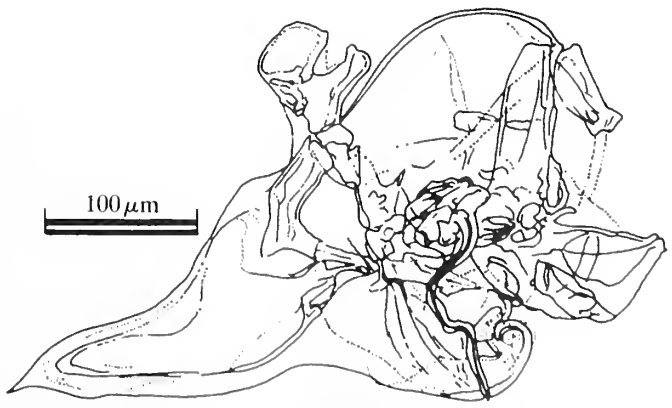
Remarks: In designating a neotype for *Carinocythereis carinata*, Ruggieri & Russo (1980, *op. cit.*) chose a specimen identical to *C. antiquata* (Baird) in all aspects except for size. This was particularly unfortunate since Roemer's original illustration is so unclear as to make its interpretation entirely subjective, whereas *C. antiquata*, although lacking a type specimen, is readily determinable from Baird's original drawing. Nevertheless, *C. antiquata* and the neotype of *C. carinata* are, in our opinion, quite clearly conspecific (compare Pl. **14**, 98, fig. 2 and Pl. **14**, 100, fig. 1) and as a result the latter name takes priority.

C. whitei (Baird) (see J. Athersuch & J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **14**, 103–110, 1987) differs from *C. carinata* principally in the disposition of the carinae. *C. carinata* possesses a marginal carina ventrally which extends without a break from the posteroventral angle around the anterior margin to the eye tubercle. *C. whitei* has a similar marginal carina which occupies the same position, but in contrast to *C. carinata*, it is replaced anteroventrally by a row of short, stout marginal spines. In addition, the carina does not form such a prominent crest above the eye tubercle. Both species possess ponticulate ventrolateral carinae. In *C. whitei* this carina extends anteriorly to run parallel to the anterior margin. A similar carina is found in *C. carinata* but it is restricted to the ventrolateral region, the anterior part being replaced by a row of four to five small tubercles. *C. whitei* is consistently smaller than *C. carinata* amongst living populations. Fossil specimens of *C. carinata* are also significantly smaller than their Recent counterparts. Minor differences in the male appendages are also useful in distinguishing between these two species.

In the juveniles (A–1, A–2) of both species, the marginal carinae are entire. However, differences seen in the ventrolateral carinae of the adults are also apparent in the juveniles. In addition, the juveniles of *C. whitei* are proportionately less high and more tapered posteriorly then those of *C. carinata*.

Distribution: Recent: British coasts, most frequently in the north (BMNH and Brady Collection, Hancock Museum); French Atlantic Coast (Yassini, 1969, *Bull. Inst. Géol. Bassin Aquitaine*, **7**); Mediterranean (Pugliese *et al.*, 1978, *Pubbl. Staz. zool. Napoli*, **40**); Black Sea (Caraion, *op. cit.*). Pliocene and Pleistocene: Mediterranean (Doruk, *op. cit.* and herein).

There is some evidence (e.g. Pugliese *et al.*, 1978), at least in the Mediterranean, that *C. carinata* (= *C. antiquata*) tends to occur more frequently in deeper water (40–130m) than *C. whitei* (= *C. bairdii*) (20–90m).



Text-fig. 1. ♂ copulatory appendage (**1984.212**). Drawing by D. J. Horne.

595.337.14 (119.1 + 119.9) (429 : 162.005.51 + 420 : 162.004.50 + 420 : 162.005.50 + 420 : 161.000.52 + 564.3 : 161.033.35 + 45 : 161.014.40) : 551.351

ON *CARINOCYTHEREIS WHITEI* (BAIRD)

by John Athersuch & John E. Whittaker
(B.P. Research Centre, Sunbury and British Museum (Natural History), London)

Carinocythereis whitei (Baird, 1850)

1850 *Cythereis Whitei* sp. nov. W. Baird, *The Natural History of British Entomostraca,* Ray Soc., London, 175, pl. 20, figs. 3, 3a.
1865 *Cythereis aspera* sp. nov. G. S. Brady, *Ann.Mag.nat.Hist.*, ser. 3, **16,** 190, pl. 9, figs. 16–19.
1868 *Cythere Whiteii* (Baird); G. S. Brady, *Trans.Linn.Soc.Lon.*, **26,** 416, pl. 30, figs. 21–24.
1969 *Carinocythereis bairdii* sp. nov. F. Uliczny, *Hemicytheridae und Trachyleberididae (Ostracoda) aus dem Pliozän der Insel Kephallinia (Westgrienchenland),* Univ. of Munich, 79, pl. 5, fig. 7; pl. 16, fig. 7.
1971 *Carinocythereis carinata* (Roemer); P. Carbonel & J. Moyes, *Revta esp. Micropaleont.*, **13,** 147–154, pl. 1, figs. 1, 4; pl. 2, figs. 1–9 (*non Cytherina carinata* Roemer, 1838).
1976 *Carinocythereis antiquata* (Baird); G. Bonaduce, G. Ciampo & M. Masoli, *Pubbl. Staz.zool.Napoli,* **40,** 49, pl. 25, figs. 8–10.
1985 *Carinocythereis whitei* (Baird); J. Athersuch, D. J. Horne & J. E. Whittaker, *J. micropalaeontol.*, **4,** 153–158, pl. 1, figs. 12–15; pl. 2, figs. 7, 8.

Lectotype: Designated herein, a female carapace from the Baird Collection, *ex.* slide no. **50.42;** housed in the Brit.Mus. (Nat.Hist.), London, cat. no. **1984.174** (now split into two valves).
Type locality: Tenby, Dyfed, SW Wales (lat. 51° 41′N, long. 4° 43′W); Recent.

Explanation of Plate 14, 104

Fig. 1, ♀ LV, ext. lat. (Lectotype, **1984.174,** 860μm long); fig. 2, ♀ RV, ext. lat. (Lectotype, **1984.174,** 840μm long); fig. 3, ♂ RV, ext. lat. (**1984.173,** 890μm long).
Scale A (250μm; × 75), figs. 1–3.

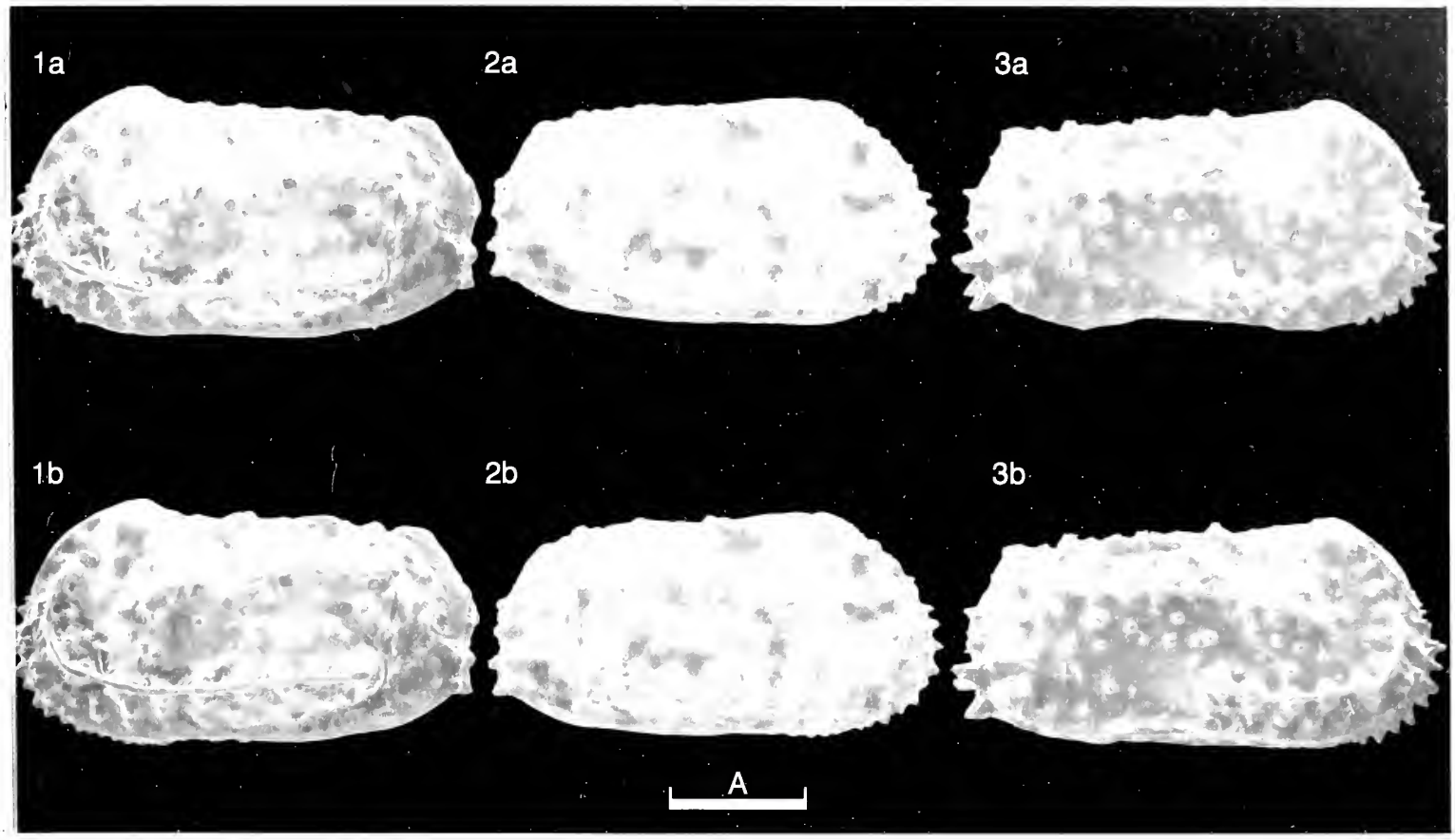
Figured specimens: British Museum (Nat. Hist.) nos. **1984.174** (Lectotype, ♀ LV + RV: Pl. **14,** 104, figs. 1, 2); **1984.173** (♂ RV: Pl. **14,** 104, fig. 3); **OS 12312** (♀ LV: Pl. **14,** 106, fig. 1); **OS 12313** (♀ RV: Pl. **14,** 106, fig. 2); **OS 12314** (♂ RV: Pl. **14,** 106, fig. 3); **1984.175** (juv. A–1 car.: Pl. **14,** 108, fig. 1); **1984.176** (♀ RV: Pl. **14,** 108, fig. 2); **1984.177** (♀ RV: Pl. **14,** 108, fig. 3); **1984.178** (♂ car.: Pl. **14,** 110, fig. 1; copulatory appendage: Text-fig. 1a); **1984.179** (♀ LV: Pl. **14,** 110, figs. 2, 3); **1984.213** (♂ copulatory appendages: Text-fig. 1b).

The lectotype (**1984.174**) is from the sole remaining syntypic slide in the Baird Collection (ex. **50.42**) at the Brit. Mus. (Brit.Hist.); collected by T. R. Jones. **1984.173, 175** and **178** are from the Norman Collection (Brit.Mus. (Nat.Hist.)): **1984.173** and **175** from Dartmouth, Devon, SW England (lat. 50° 21′N, 3° 37′W) (ex slide no. **1911.11.8.M 3372**); **1984.178** from Plymouth, Devon (approx. lat. 50° 22′N, 4° 08′W). **1984.176** and **1984.213** were collected alive by J. Athersuch from coarse sand in Famagusta Bay. Cyprus (approx. lat. 35° 10′N, long. 33° 58′E), water depth 30m, salinity 39.4‰, during November 1973. **1983.177** and **179,** from the Bay of Naples (approx. lat. 40° 50′N, long. 14° 17′E), were kindly provided by Dr. G. Bonaduce. **OS 12312–12314** are from the Nar Valley Clay, East Winch, Norfolk (lat. 00° 32′E, long. 52° 44′N), collected by P. G. Cambridge and B. M. Funnell; Pleistocene (Hoxnian?).

Diagnosis: Anterior margin with carina which is entire and ponticulate dorsally, and disconnected ventrally to form a row of short spines. Ventrolateral carina extends to run parallel to anterior margin. Male copulatory appendage distinctive.

Explanation of Plate 14, 106

Fig. 1, ♀ LV, ext. lat. (**OS 12312,** 745μm long); fig. 2, ♀ RV, ext. lat. (**OS 12313,** 740μm long); fig. 3, ♂ RV, ext. lat. (**OS 12314,** 780μm long).
Scale A (250μm; × 75), figs. 1–3.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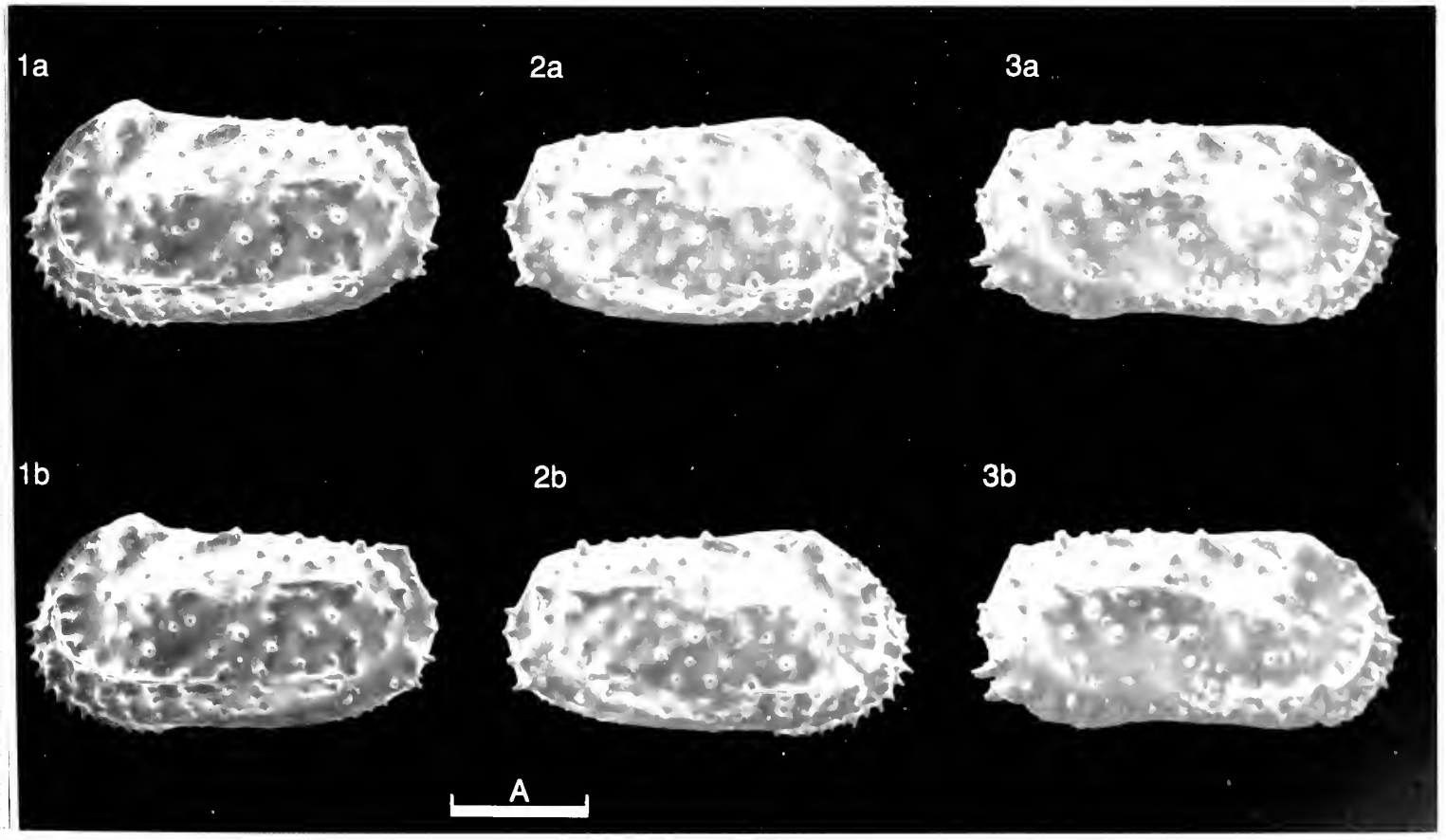
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Remarks: This species was recognised by Baird (1850, *op. cit.*), Brady (1868, *op. cit.*) and Brady, Crosskey & Robertson (1874, *Palaentogr. Soc. Monogr.*) as being distinct from *C. carinata* (Roemer, 1838) = *C. antiquata* (Baird, 1850). All of these authors, however, illustrated and described poorly preserved specimens of *C. whitei*, a fact that has tended to mask the true differences between these two species. (Worn specimens appear more nodose when the carinae are abraded). However, an examination of Baird's syntypes, one of which is illustrated herein (Pl. **14,** 104, figs 1, 2) leaves us in no doubt as to the true identity of *C. whitei*. The main difference between *C. whitei* and *C. carinata* (Roemer) is in the length and disposition of the ventrolateral and anterolateral carinae (see also *Remarks* on *C. carinata* (Roemer) in J. Athersuch & J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **14,** 97–102, 1987). There is some variation in the development of the carinae in both Recent and fossil forms (cf. Pl. **14,** 106, figs. 2, 3; Pl. 14, 108, figs 2, 3), a factor which seems to be related to calcification of the carapace as a whole.

Until Athersuch, Horne & Whittaker (1985, *op. cit.*) reinstated the name *C. whitei*, G. S. Brady & A. M. Norman (*Scient.Trans.R.Dubl.Soc.*, ser. 2, **4,** 1889) were apparently the last authors to regard it as a distinct species in Britain and the only records under this name in the Mediterranean appear to be those of Ruggieri, 1956 (*Att Soc.ital.Sci.nat.*, **95**) and Uliczny, 1969 (*op. cit.*). Otherwise, the name *whitei* seems to have fallen into disuse and specimens referable to this species have usually been described as either *C. antiquata* (Baird) or *C. bairdii* Uliczny.

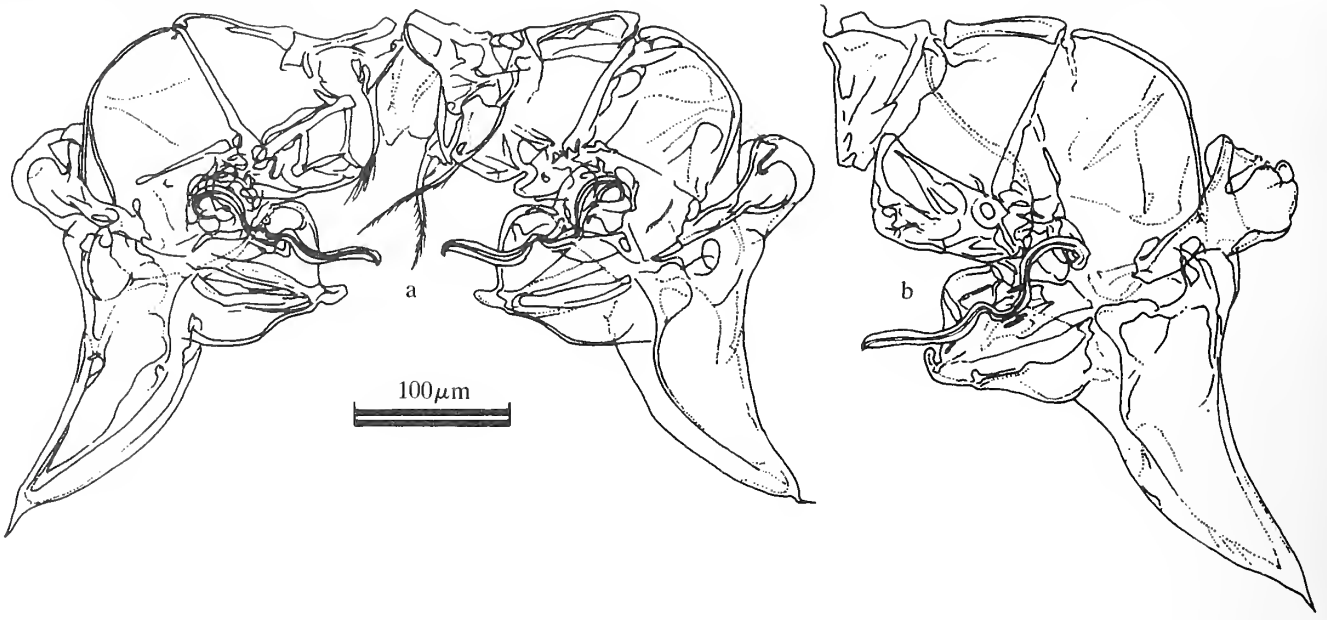
Distribution: Recent: British coasts (most frequently in the south), French Atlantic coast and widespread throughout the Mediterranean (recorded as *C. antiquata* or *C. bairdii*). A sublittoral species found at depths of 20–60m or more.

Fossil: Pleistocene and Pliocene of the Mediterranean (under a variety of names) (Uliczny, *op. cit.*; Ruggieri, *op.cit.*); Pleistocene of England (as *C. aspera*).

Explanation of Plate 14, 108

Fig. 1, juv. A–1 car., ext. lt. lat. (**1984.175,** 700μm long); fig. 2, ♀ RV, ext. lat. (**1984.176,** 890μm long); fig. 3, ♀ RV, ext. lat. (**1984.177,** 780μm long).

Scale A (250μm; × 75), figs 1–3.

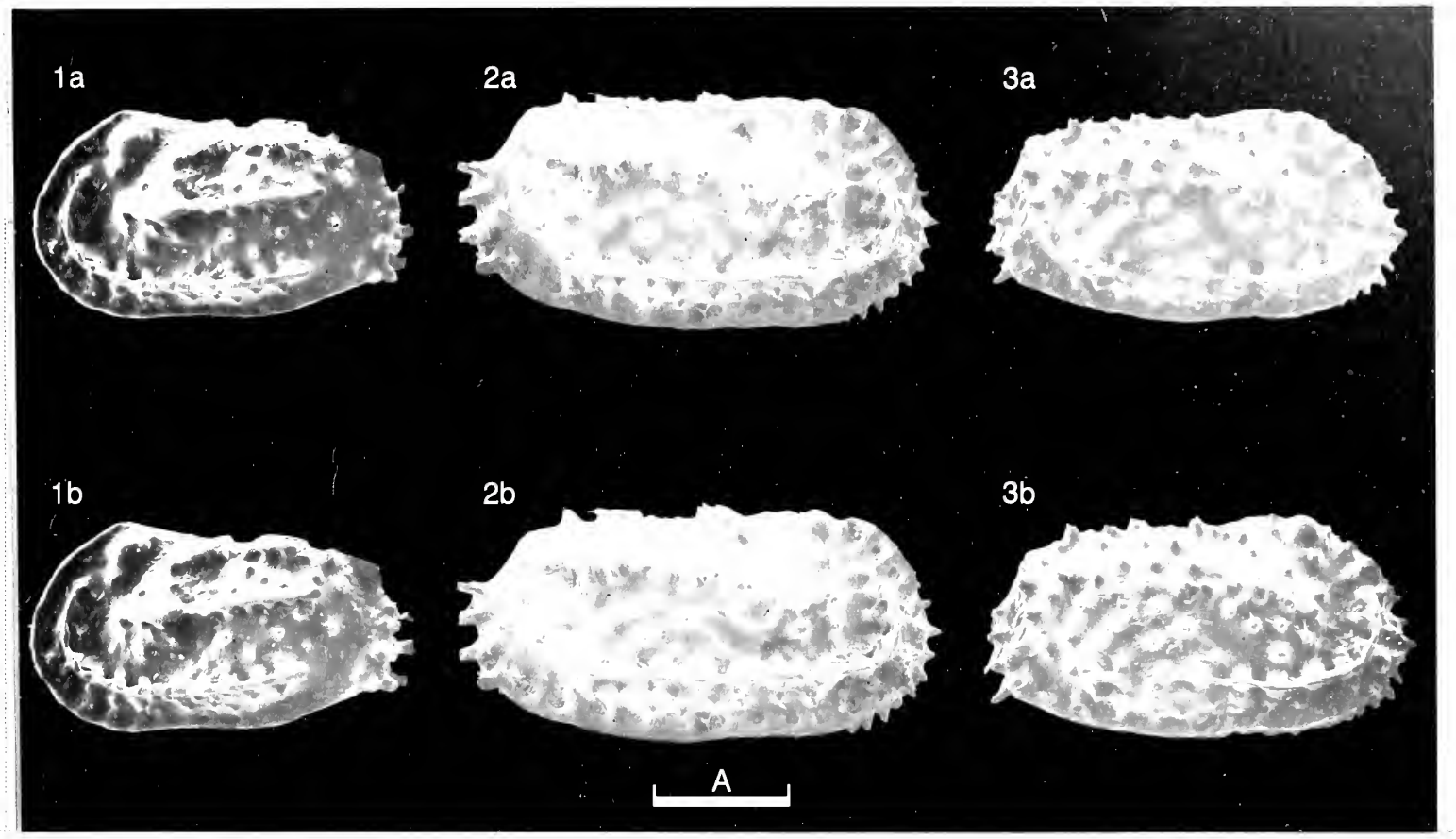


Text-fig. 1. ♂ copulatory appendages: a, (**1984.178**), Recent of Britain; b, (**1984.213**), Recent of the Mediterranean. Drawings by D. J. Horne.

Explanation of Plate 14, 110

Fig. 1, ♂ car., ext. vent. (**1984.178,** 890μm long); fig. 2, ♀ LV, int. lat. (**1984.179,** 800μm long); fig. 3, ♀ LV, int. musc. sc. (**1984.179**).

Scale A (250μm; × 75), figs. 1,2; scale B (50μm; × 310), fig. 3.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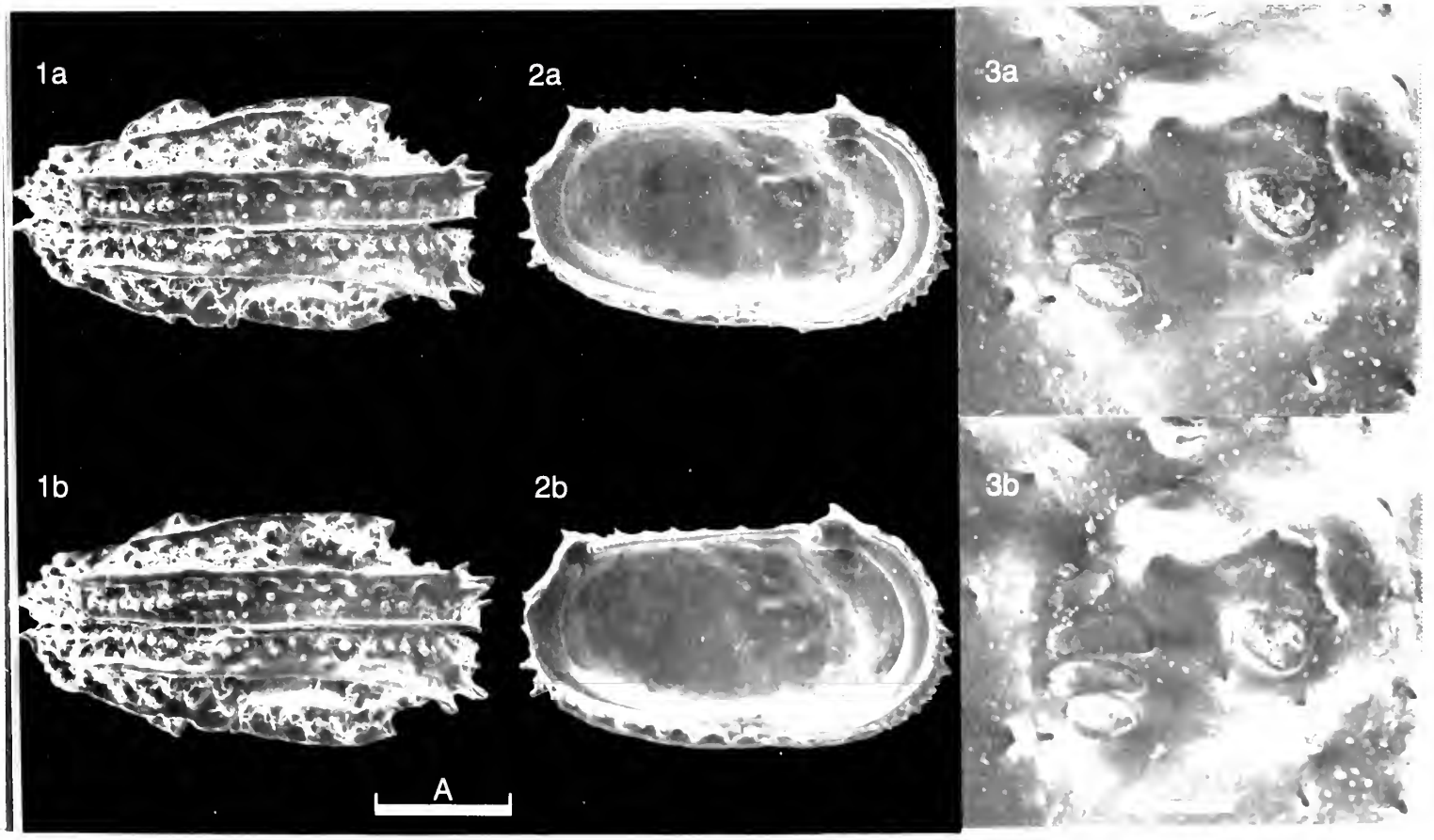
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595.337.14 (119.15–118.21) (510 : 161.103.27) : 551.313.1 + 552.52

ON *ABROTOCYTHERE QUINQUICORNIS* ZHAO gen. et sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Genus *ABROTOCYTHERE* gen. nov.

Type-species: *Abrotocythere quinquicornis* sp. nov.

Derivation of name: Greek, meaning beautiful; in reference to its surface ornamentation + *cythere*.

Diagnosis: Genus small (adults 390–460μm), subrectangular to truncated oval in side view, with well developed posteroventral cyathus in the right valve. Right valve hinge with narrow elongate tooth anteriorly and large rounded tooth posteriorly separated by a groove which is very wide in its anterior half and disappears under the dorsal margin posteriorly. Muscle scar pattern a vertical row of four adductor scars with rounded mandibular and frontal scars.

Remarks: Appendages and soft parts are unknown but the nature of the adductor muscle scar pattern places the new genus in the Cytheracea. The general carapace features place it in the Limnocytheridae and it can be assigned to the Subfamily Timiriaseviinae. Here it has affinities with the *Kovalovskiella (Rosacythere)* and *Theriosynoecum* groups of Colin & Danielopol (*Palaeobiologie Continentale* XI, 1, 13–17, 1980). Although the hinge structure is very similar, it differs from *Theriosynoecum* in the general nature of the ornamentation as well as in shape, which in *Abrotocythere* is much more rectangular and less rounded, particularly posteriorly. It is closest to the Cretaceous genus *Rosacythere* Colin, 1980 from which it differs most markedly in having the positive elements of the hinge structure in the right valve. In size (390–460μm) it is also much smaller than both *Rosacythere* (560–600μm) and *Theriosynoecum* (620–1420μm). *Abrotocythere* may be regarded as a Tertiary derivative of *Rosacythere* and may thus belong in the *Kovalovskiella* group.

Explanation of Plate 14, 112

Fig. 1, 2, RV, (holotype, **103070,** 390μm long): fig. 1, ext. lat., fig. 2, ext. dors. Scale A (100μm; × 245), figs. 1, 2.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China; coll. no. **103070, RV.** [Paratypes: eight valves, Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103071, 90870–90876**].

Type locality: Section at Gaocanzi, Zhongshui town, Weining County, Guizhou province, SW China; lat. 27° 20′N, long. 103° 39′E. From a marl lens in mudstones of Miocene (or possibly Oligocene) age.

Derivation of name: Latin; reference to the five horn-like spines or pore conuli in the posterior half of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103070** (holotype, RV: Pl. **14,** 112, figs. 1, 2), **103071** (paratype, RV: Pl. **14,** 114, figs. 1, 2). Both figured specimens are from the type locality and horizon.

Diagnosis: A small (390μm) species of *Abrotocythere,* subrectanglar in side view with strong infracurvature, the anterodorsal margin sloping gently at about 45° to the vertical. Straight dorsal and ventral margins are parallel, slightly concave in their median part and truncated posteriorly by the vertical posterior margin. Left valve slightly larger than right valve with ventral overlap medianly and a well developed posteroventral cyathus in the right valve. Wide, shallow "V" shaped sulcus anterodorsally giving a dorsal view reminiscent of a calabash. Primary puncta pentgonal or subrounded with secondary pitting. Pore canal openings are clearly visible at the top of the pore conuli and on the ridges of the reticulation anteriorly. Inner lamella narrow with very small vestibules at each end, selvage strong. Hinge typical of genus. A vertical row of four adductor scars lies on a platform in front of the strongly vaulted posterior part of the shell and these scars are also seen on the external surface. There are two oval mandibular scars anteroventrally and a round frontal scar level with the topmost adductor scar.

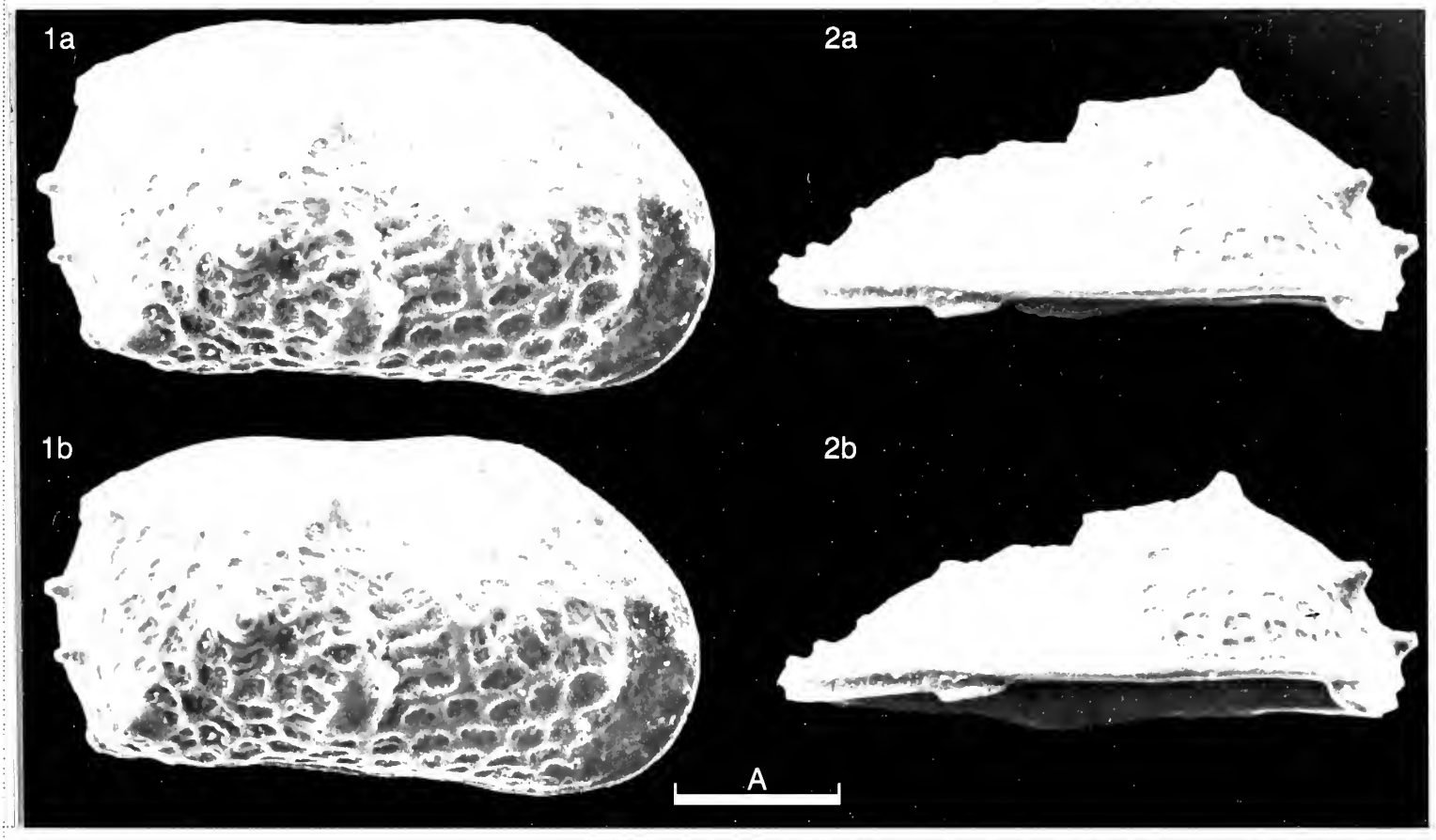
Remarks: *A.quinquicornis* differs from *A.ovata* Zhao (*Stereo-Atlas Ostracod Shells,* **14,** (26) 115–118, 1987) in its smaller size and in the development of five prominent tubercles/spines posteriorly.

Distribution: *Abrotocythere quinquicornis* and *Abrotocythere ovata* Zhao have been found in the Guizhou Province, SW China in beds of (?) Oligocene-Miocene age; they are associated with gastropods which are thought to occupy an oligohaline niche.

Acknowledgment: This study was undertaken while a visiting Research Scholar in the Department of Geology, University of Hull, England.

Explanation of Plate 14, 114

Fig. 1, 2, RV (paratype, **103701,** 390μm long); fig. 1, int. lat., fig. 2, ext. dors. Scale A (100μm; × 248), figs. 1, 2.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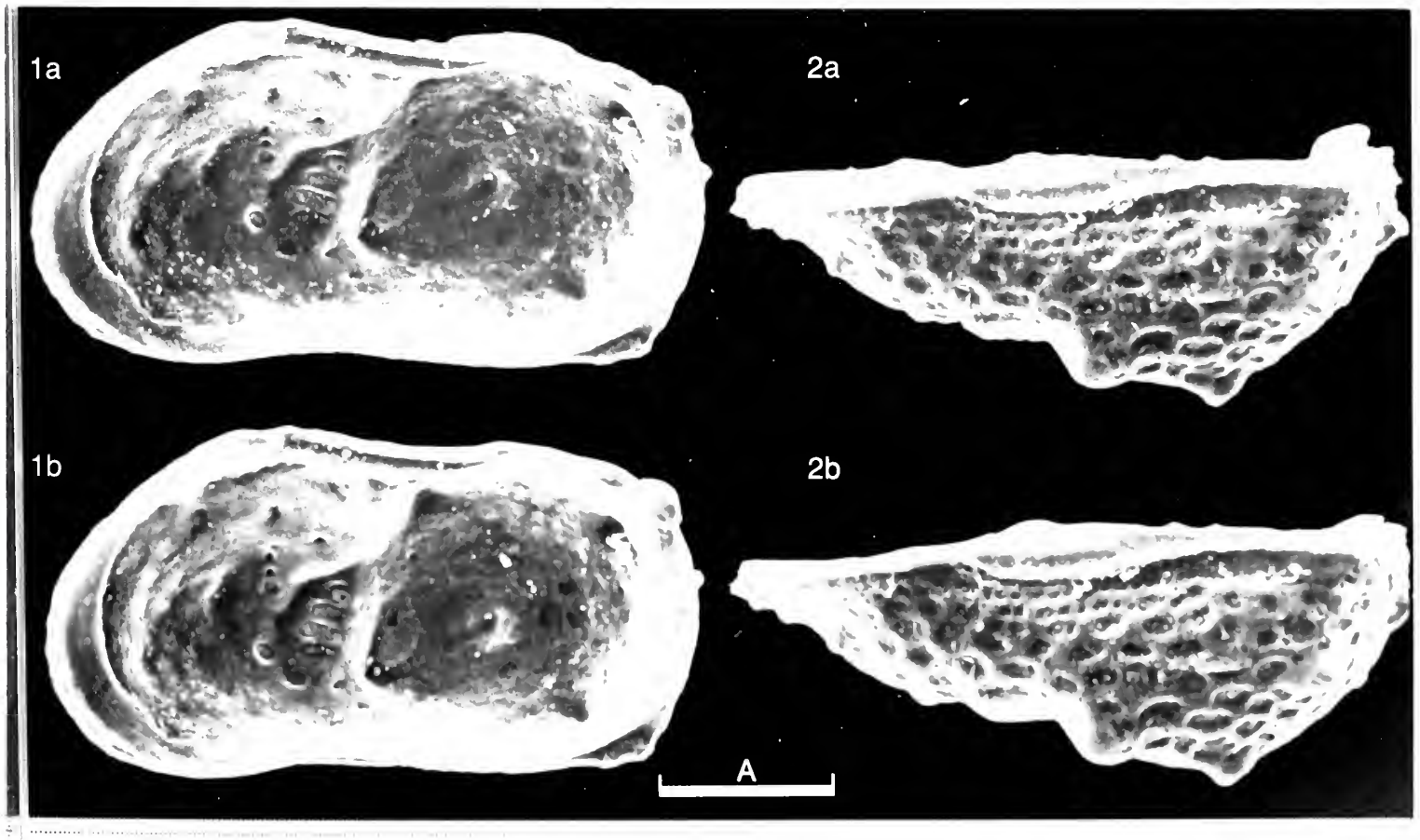
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595.337.14 (118.15–118.21) (510 : 161.103.27) : 551.313.1 + 552.52

ON *ABROTOCYTHERE OVATA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Abrotocythere ovata sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103072**; RV. [Paratypes: two valves, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103073(1)–103074(2)**].

Type locality: Section at Gaokanzi, Zhongshui town, Weining county, Guizhou province, SW China, lat. 27° 20′N, 103° 39′E. From a marl lens in mudstones of Miocene (or possibly Oligocene) age.

Derivation of name: Referring to the oval outline of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103072** (holotype, RV: Pl. **14,** 116, fig. 1; Pl. **14,** 118, fig. 2), **103073(1)** (paratype, RV: Pl. **14,** 118, fig. 1), **103073(2)** (paratype, LV: Pl. **14,** 116, fig. 2). All of the figured specimens are from the type locality and horizon.

Diagnosis: Small, truncated oval in lateral view, cordate in dorsal view. Dorsal and ventral margins subparallel. Right valve with strong posteroventral cyathus. Wide, shallow V-shaped sulcus anterodorsally. Surface with subrounded fossae with secondary pitting, in some areas arranged in the manner of fish scales. Size of fossae variable becoming smaller anterodorsally near the shallow V-shaped sulcus. The elongate, round, posteroventral tubercle lies slightly behind mid-length and is inclined downwards anteriorly at an angle of about 30° to the horizontal. Inner lamella narrow

Explanation of Plate 14, 116

Fig. 1, RV, ext. lat. (holotype, **103072,** 460μm long); fig. 2, LV, ext. lat. (paratype, **103073(2),** 445μm long). Scale A (100μm; × 205), figs. 1; scale B (100μm; × 177), fig. 2.

Diagnosis: (cont.) with very small vestibule anteriorly. Hinge characteristic of the genus with elongate anterior tooth plate, large rounded posterior tooth and connecting groove in the right valve. A vertical row of four adductor scars lies on a platform in front of the swollen posterior part of the shell. There are two small rounded and closed mandibular scars anteroventrally.

Remarks: This species occurs with *Abrotocythere quinquicornis* Zhao (*Stereo-Atlas Ostracod Shells,* **14,** 111, 1987) to which it is obviously closely related. It differs in a number of important respects. With a length generally 450–460μm, *A.ovata* is consistently larger than *A.quinquicornis* (390μm). Ornamentation also differs consistently. The present species, whilst showing the basic elements of sulcus, reticulation and tuberculation differs in a number of important respects. *A.ovata* lacks the five prominent tubercles/spines of *A.quinquicornis.* In this it might simply be considered a morph of the latter species but for the fact that the tubercle that is developed is elongated in a direction virtually at right angles to the direction the one which occurs in roughly the same position in *A.quinquicornis.* They can not be regarded as homologous and the pattern of fossae round these respective tubercles is also quite different. Similarly these same differences suggest that this is not a case of sexual dimorphism and the current taxon is regarded as a species different from, but co-eval with, *A.quinquicornis.*

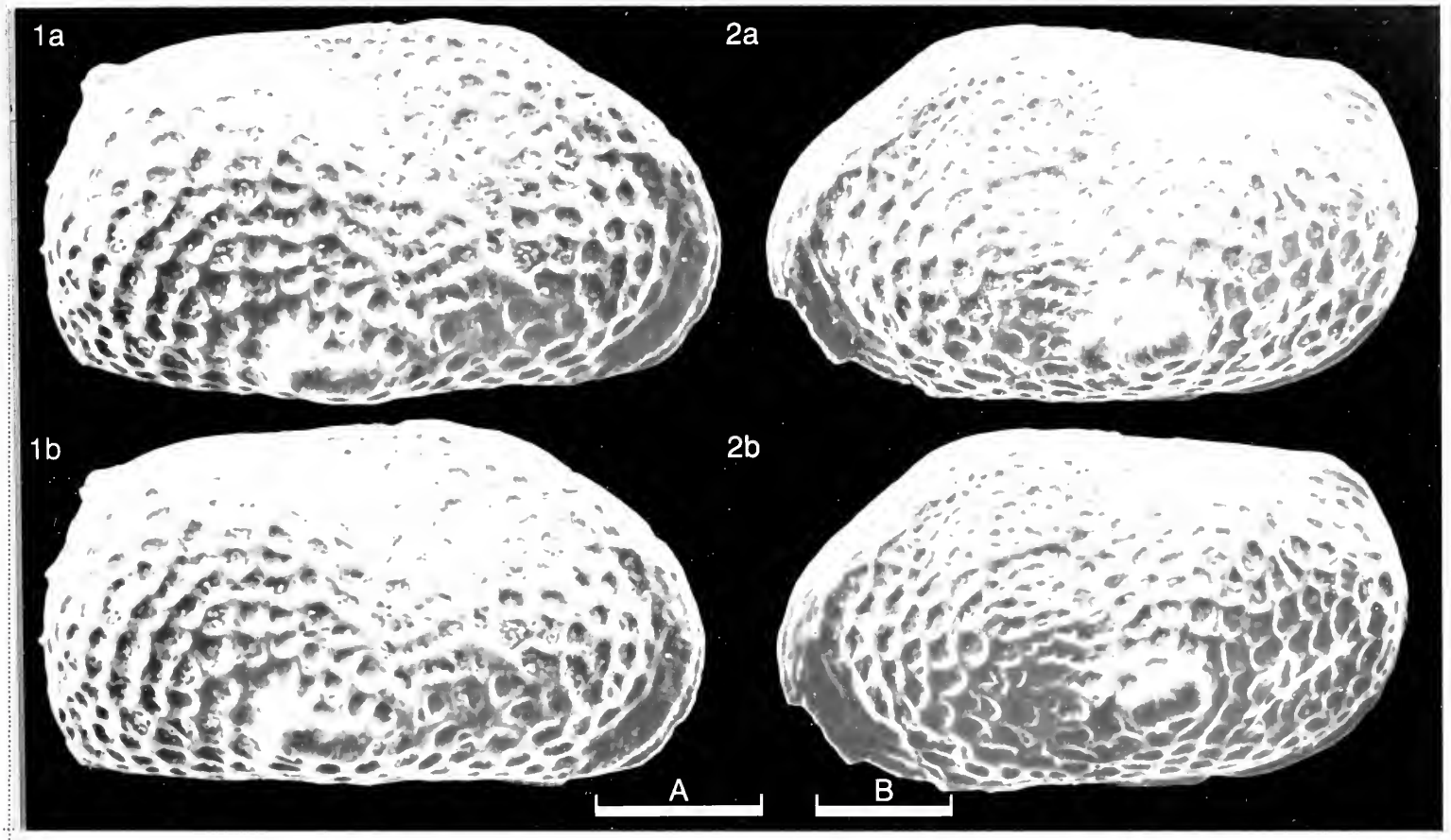
A.ovata is somewhat similar in outline to *Kovalevskiella phreaticola* (Danielopol) (Colin and Danielopol, *Paleobiologie Continentale,* **XI, 1,** pl. 2, fig. 1, 2, 1980) and other *Kovalevskiella* species (Colin and Danielopol, *Paleobio, Contin.,* **XI, 1,** 13–14, pl. 1–5, 1980), but there are clear differences in ornamentation, hinge structure and muscle scar pattern.

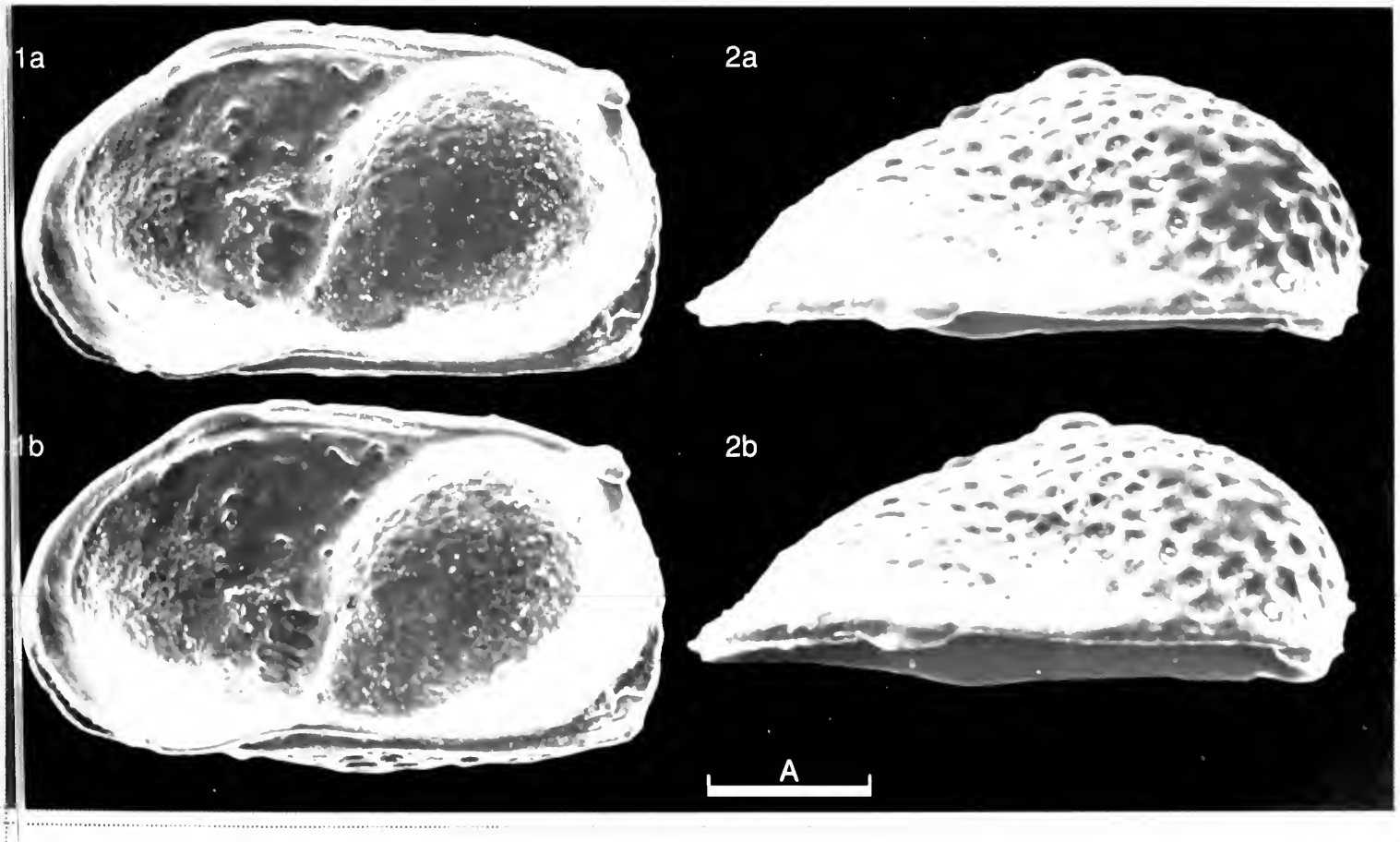
Distribution: *Abrotocythere ovata* and *Abrotocythere quinquicornis* (*Stereo-Atlas Ostracod Shells,* **14,** 111, 1987) have been found in Guizhou Province, SW China, in beds of Miocene (or possibly Oligocene) age. They are associated with gastropods which are thought to have lived in an oligohaline habitat.

Acknowledgment: This study was undertaken while a visiting Research scholar in the Department of Geology, University of Hull, England.

Explanation of Plate 14, 118

Fig. 1, RV int. lat. (paratype, **103073(1),** 450μm long); fig. 2, RV ext. dors. (holotype, **103072,** 460μm long). Scale A (100μm; × 212), figs. 1, 2.


1a
2a
1b
2b
A
B


1a
2a
1b
2b
A

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LEUCOCYTHERE WEININGENSIS* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Leucocythere weiningensis sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103064;** carapace.

[Paratypes: valve and carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103065–103066**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 21m from the surface; black mudstones of Pleistocene age.

Derivation of name: From its occurrence in the Weining County, Guizhou Province, SW China.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103064** (holotype, car.: Pl. **14,** 120, figs. 1, 2), **103065** (paratype, RV: Pl. **14,** 122, fig. 1.), **103066** (paratype, car.: Pl. **14,** 122, fig. 2). All of the figured specimens are from the type locality and horizon.

Explanation of Plate 14, 120

Figs. 1, 2, car. (holotype, **103064,** 470μm long): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.
Scale A (100μm; × 201), figs. 1, 2.

Diagnosis: Carapace small; dorsal margin straight, inclined towards posterior; ventral slightly concave in the median part. Highest and widest about one-third length from the anterior end. Surface reticulate with secondary pitting in the fossae. Two vertical dorsal sulci in the anterior half of the shell, the most prominent lying just in front of mid-length. Pores occur at the intersections of some muri of which two or three anteriorly, and about half a dozen posteriorly form fairly prominent pore conuli. There is a small backward projecting spine at about three-quarters length and at about one-fifth the height above the ventral margin. Some specimens show a sulcus immediately behind this spine (Pl. **14,** 120, fig. 2). Vertical row of four adductor scars placed low on the shell on the anterior side of the internal ridge, with two rounded mandibular scars more ventrally. Hinge merodont with straight toothplate subdivided into three toothlets anteriorly, a locellate groove and a prominent elliptical tooth posteriorly in the right valve.

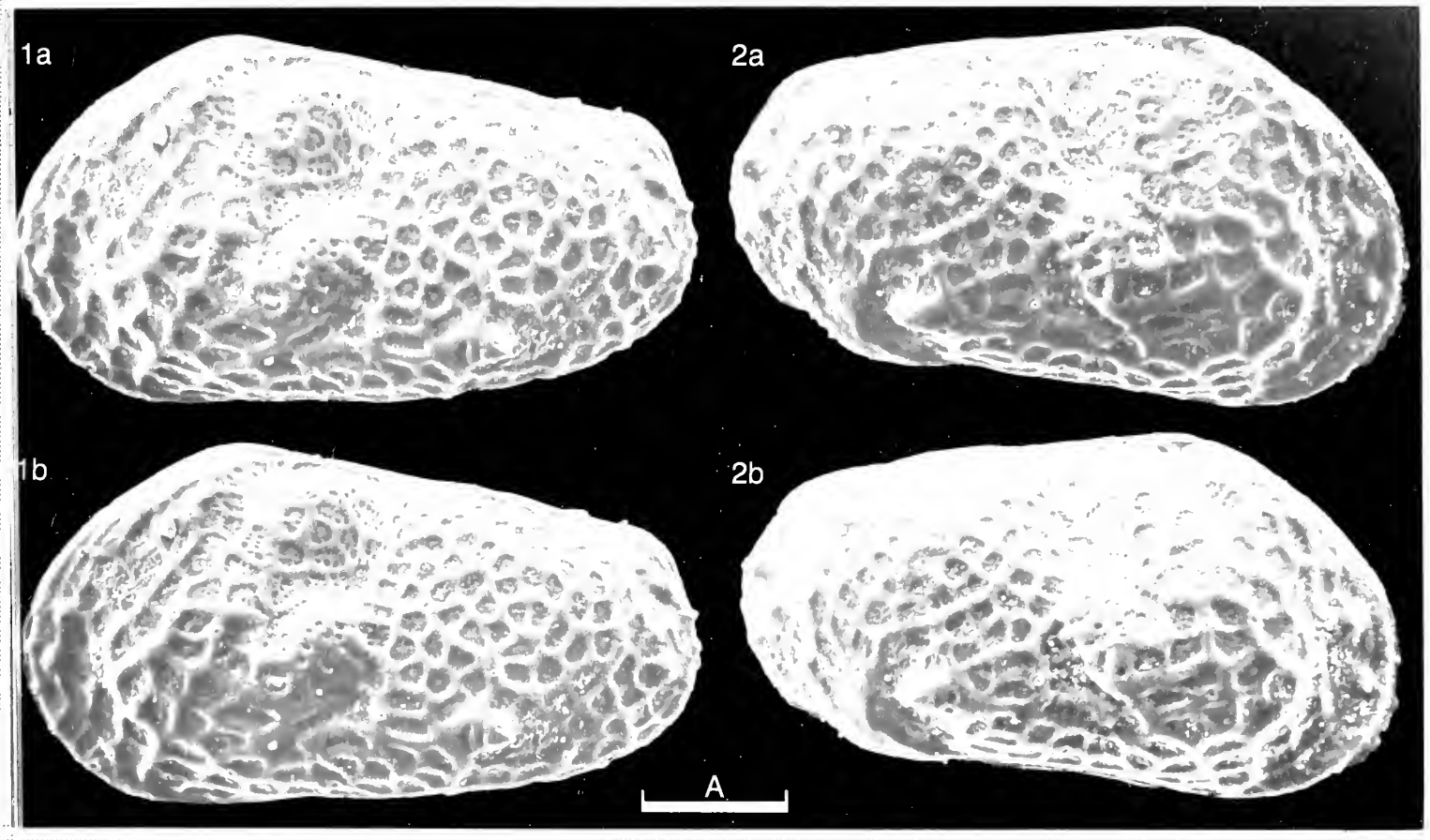
Remarks: This species is related to *Leucocythere plena* Zhao (see *Stereo-Atlas Ostracod Shells,* **14,** 123, 1987), but the latter is more swollen posteriorly, with a concave posterior outline in dorsal view, and the hinge structure is less well developed.

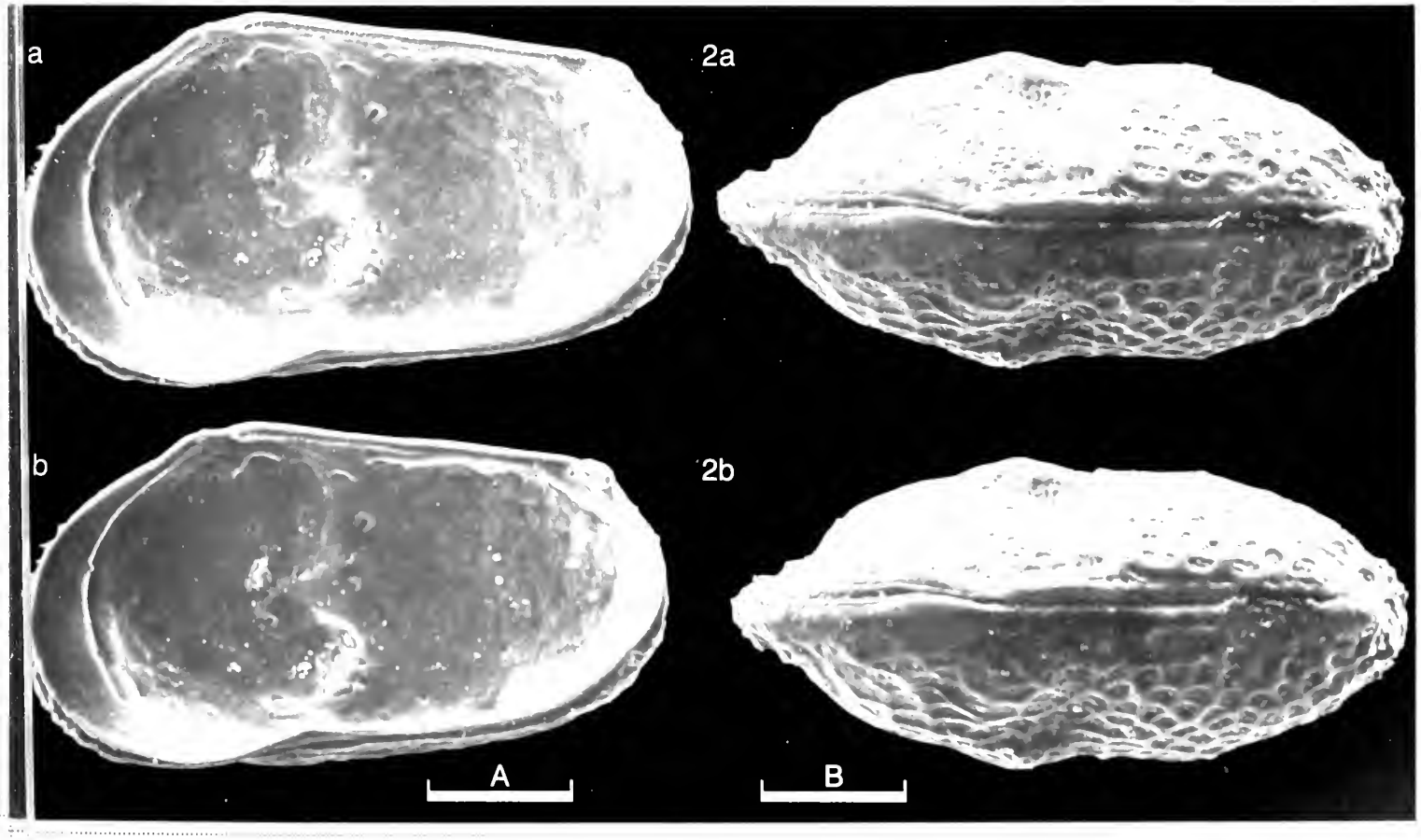
Distribution: This species has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

Acknowledgement: This study was undertaken as a visiting research scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 122

Fig. 1, RV int. lat. (paratype, **103065,** 450μm long); fig. 2, car., ext. dors. (paratype, **103066,** 470μm long).
Scale A (100μm; × 210), fig 1; scale B (100μm; × 205), fig. 2.


1a
2a
1b
2b
A


a
2a
b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LEUCOCYTHERE PLENA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Leucocythere plena sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103067**; carapace.

[Paratypes: valve and carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103068–103069**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 21m from the surface; black mudstones of Pleistocene age.

Derivation of name: From the latin *plenus,* plump, stout; in reference to the swollen posterior half of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103067** (holotype, car.: Pl. **14,** 124, figs. 1, 2), **103068** (paratype, RV: Pl. **14,** 126, fig. 1.), **103069** (paratype, car.: Pl. **14,** 126, fig. 2). All of the figured specimens are from the type locality and horizon.

Explanation of Plate 14, 124

Figs. 1, 2, car. (holotype, **103067,** 520μm long): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.
Scale A (100μm; × 178), figs. 1, 2.

Diagnosis: Small to medium sized carapace with gently concave dorsum inclined posteriorly. Highest anteriorly at about one-third the length. Two dorsal vertical sulci in the anterior half of the shell; sub-central tubercle; posterior half of shell swollen. Sparse pore conuli developed over the surface of the shell and developed posteriorly where they form distinct tubercles. Ornamentation of subdued reticulation with round secondary pits occupying the fossae. Ten marginal pore canals anteriorly. Vertical row of four adductor scars in the ventral part of the shell and lying on the anterior flank of the median internal ridge which defines the posterior limit of the sub-central tubercle. Hinge merodont with narrow, well-defined anterior and posterior toothplates with thin, sinuous groove in between.

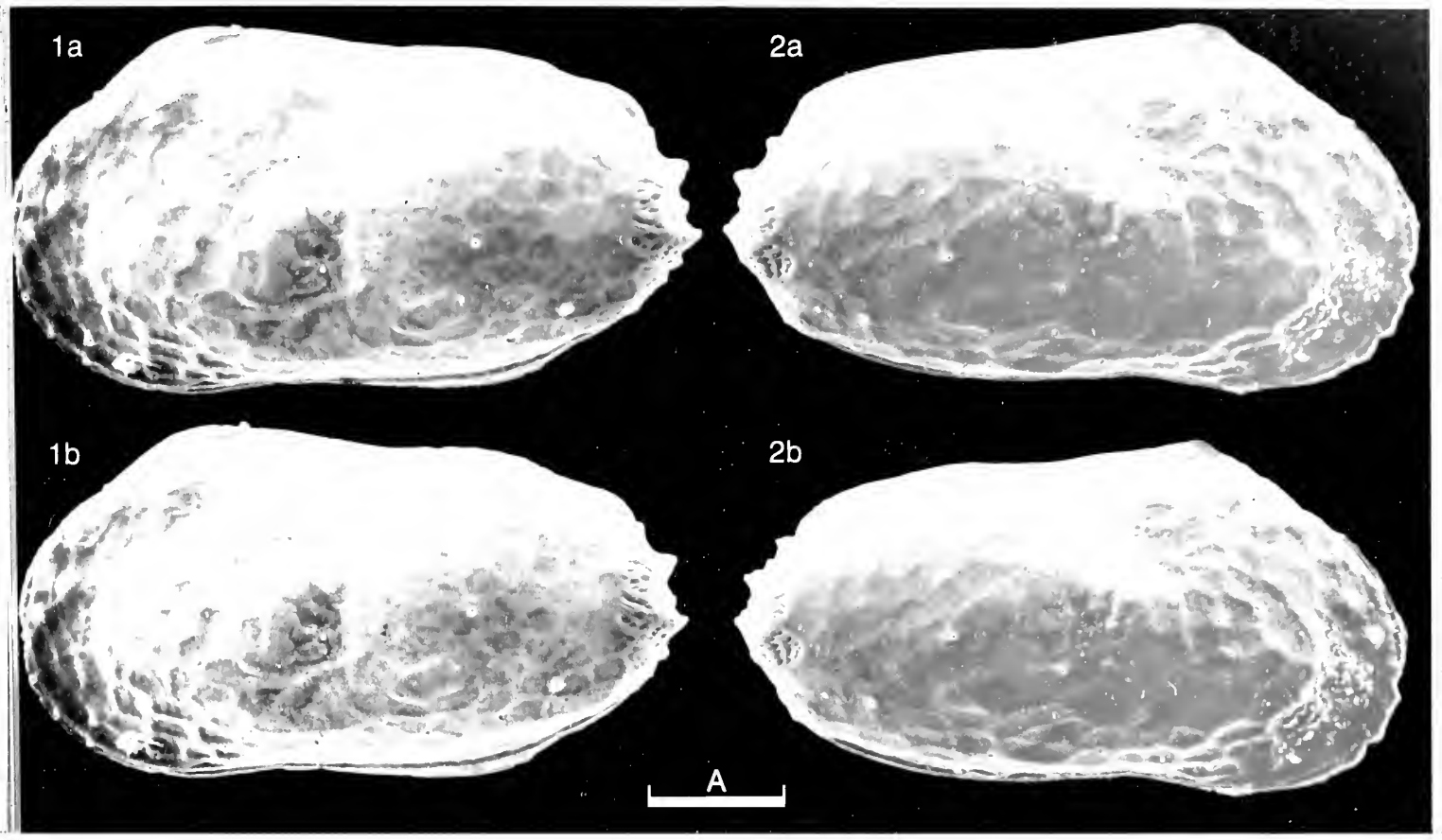
Remarks: This species is closely related to *L.weiningensis* Zhao (see *Stereo-Atlas Ostracod Shells,* **14,** 119, 1987) but differs in its concave dorsum, less differentiated hinge, subdued ornamentation and marked posterior swelling. The present species is also related to *L.subquadrata* Huang & You, 1982 (Huang, Yang & You, *Palaeontology of Xizang,* Book **IV,** 377, fig. 6, pl. 14, fig. 3, 1982, Beijing), but that species lacks the carapace sulci and does not show the posterior inflation of *L.plena.*

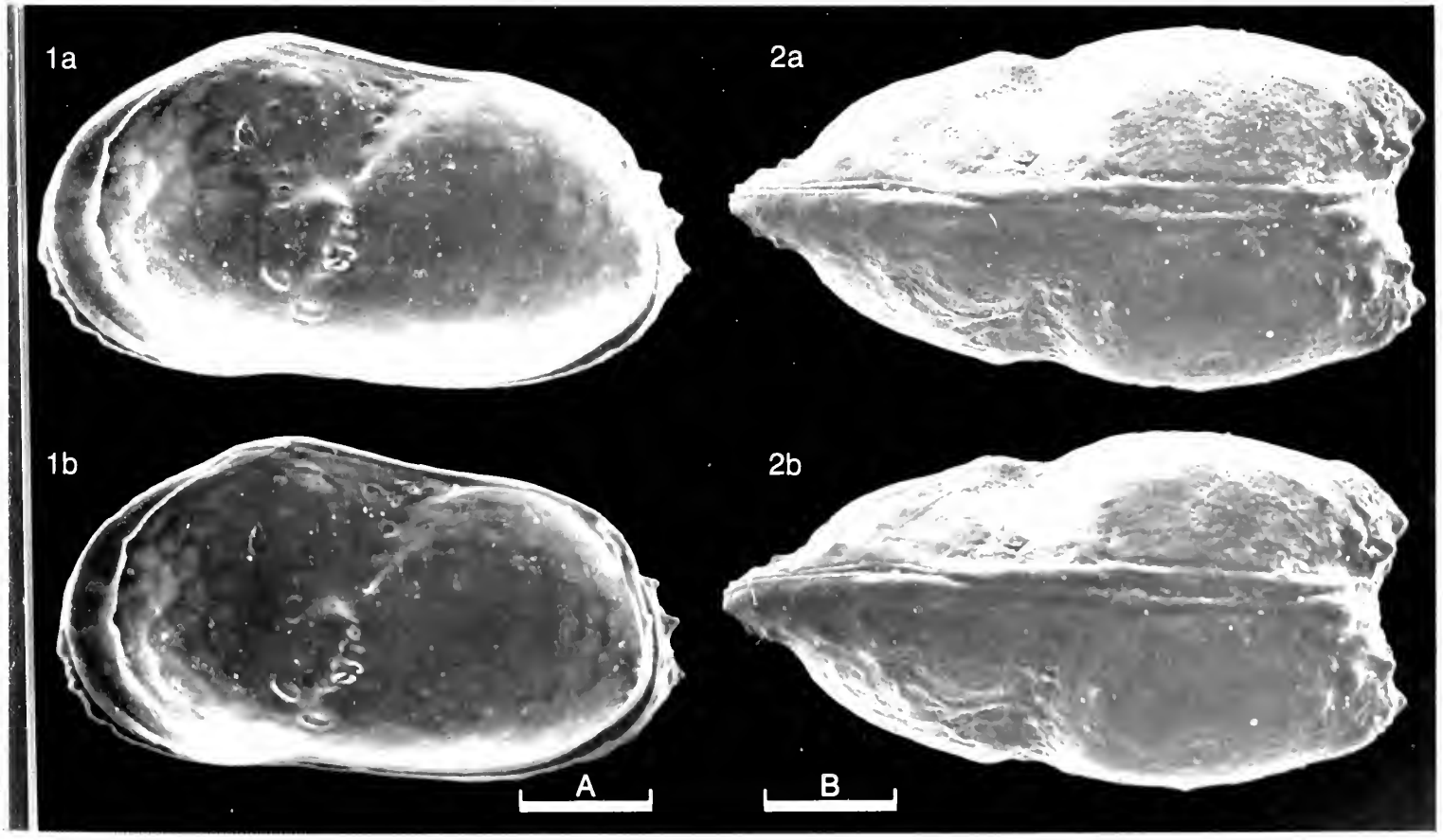
Distribution: *L.plena* has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 126

Fig. 1, RV int. lat. (paratype, **103068,** 490μm long); fig. 2, car., ext. dors. (paratype, **103069,** 520μm long).
Scale A (100μm; × 188), fig. 1; scale B (100μm; × 186), fig. 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LIMNOCYTHERE XINANENSIS* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Limnocythere xinanensis sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103060;** ♀ LV.
[Paratypes: three female valves and carapaces, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103061–103063**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 17m from the surface; black shale of Pleistocene age.

Derivation of name: From its occurrence in the Xinan region of China.

Figured specimens: Nanjing Institute of Geology and Palaeontology nos. **103060** (holotype, ♀ LV: Pl. **14,** 128, fig. 1), **10361** (paratype, ♀RV: Pl. **14,** 128, fig. 2), **10362** (paratype, ♀ RV: Pl. **14,** 130, fig. 1), **103063** (paratype, ♀ car.: Pl. **14,** 130, fig. 2). All of the figured specimens are from the type locality and horizon.

Diagnosis: Shell reniform but more broadly rounded in front, dorsal side straight, ventral side curved. Median and anterior dorsal, vertical sulci occur, of which the median is the stronger. Surface ornamentation of five nodes and primary and secondary reticulation. Two nodes lie in the dorsal half of the shell on either side of the median sulcus. The other nodes lie in the ventral half of the shell, one behind the median sulcus, the other two smaller nodes lie one above the other in front of the median sulcus. Hinge merodont with terminal undivided toothplates linked by a groove in the

Explanation of Plate 14, 128

Fig. 1, ♀LV, ext. lat. (holotype, **103060,** 480μm long); fig. 2, ♀ RV, ext. lat. (paratype, **103061,** 490μm long). Scale A (100μm; × 187), figs. 1, 2.

Diagnosis: (cont.) right valve. Row of four closely pressed adductor muscle scars centrally placed on the ridge which represents the expression of the median sulcus internally, frontal scar oval on the same level as the two uppermost adductors and two rounded mandibular scars more ventrally placed. In dorsal view pointed anteriorly and somewhat arrow-shaped. Three small dorsal spines in the posterior half of the right valve.

Remarks: *L.xinanensis* is closely related to *L.stationis* Vávra, 1891 but differs clearly from the latter species as originally figured (*Archiv Naturw. Landesd. Böhmens,* **8,** 109, fig. 38, 1891) in being much more slender and more pointed posteriorly in dorsal view and in tapering more posteriorly and not being so evenly rounded anteriorly in lateral view. *L.stationis* was thought to be confined to Europe until Martens (*Hydrobiologia,* **110,** 138–141, figs. 9–16, 1984) recorded it from the Sudan and gave good illustrations, Martens' material is much nearer to the Chinese material in dorsal view but in lateral aspect does not taper so much posteriorly and the dorsal margin shows a more pronounced break in slope than does *L.xinanensis* where the dorsal margin is long and straight. Martens notes the variability of dorsal spines in *L.stationis* where up to three may be found although they were completely absent from his African specimens. *L.xinanensis* shows a similar variability in the development of these spines. *L.xinanensis* from the lower part of the present section consisted of many females and rare males neither of which carried dorsal spines. In the middle of the section specimens with one dorsal spine were found and both males and females were present, whilst in the upper part of the section many males and females occurred which had three dorsal spines.

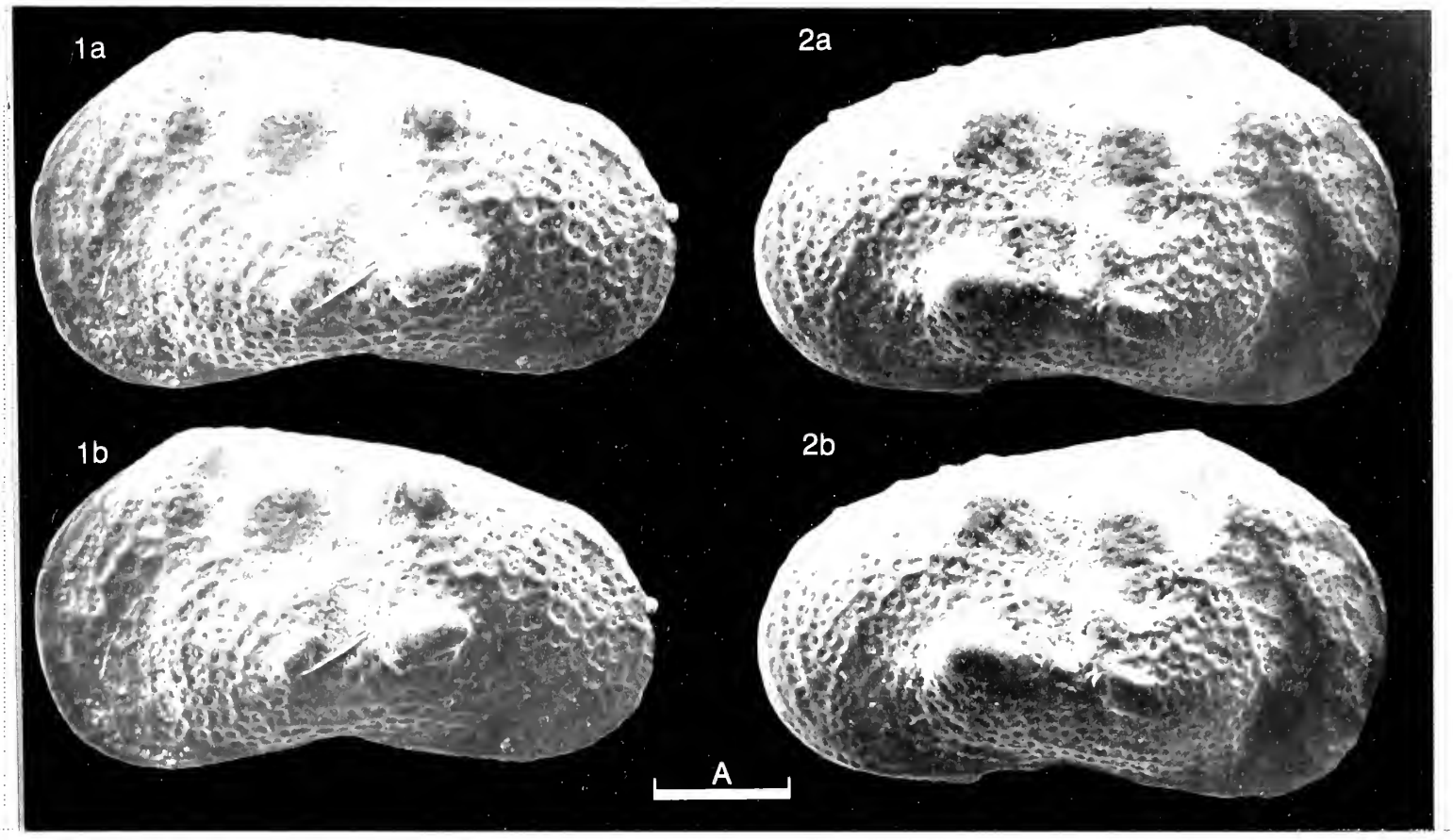
De Deckker's Australian species *L.dorsosicula* (*Proc. R. Soc. Vict.,* **93,** 43–45, figs. 1, 2a–i, 1981) has between three and six spines dorsally and also differs in its much reduced turberculation. Comparisons with other species are not close.

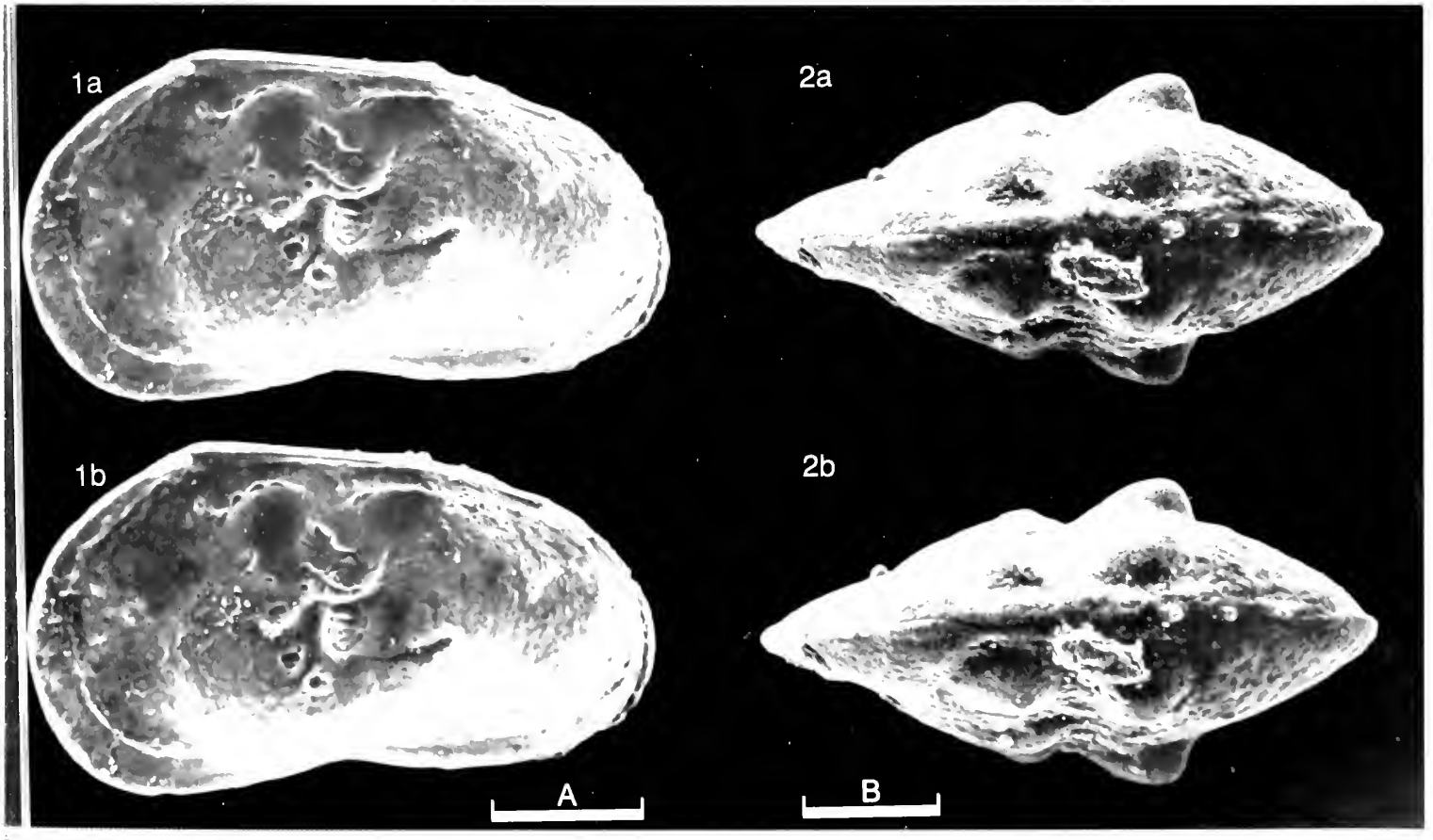
Distribution: *Limnocythere xinanensis* has been found in the Guizhou Yunnan Province in China in deposits ranging from Pleistocene to Recent in age.

Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 130

Fig. 1, ♀ RV, int. lat. (paratype, **103062,** 440μm long); fig. 2, ♀ car. ext. dors. (paratype, **103063,** 480μm long). Scale A (100μm; × 207), fig. 1; scale B (100μm; × 183), fig. 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *METACYPRIS APHTHOSA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Metacypris aphthosa sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103074(a)**; ♀ carapace.

[Paratypes: two male valves, one female carapace and one male carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103074(b)–103074(e)**].

Type locality: Borehole at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 27m from the surface; black mudstones of Pleistocene age (Q2–3).

Derivation of name: Greek *aphthosus,* measles; in reference to the surface ornamentation.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103074(a)** (holotype, ♀ car.; RV: Pl. **14,** 132, figs. 1, 3), **10374(b)** (paratype, ♀ car: Pl. **14,** 132, fig. 2), **103074(c)** (paratype, ♂ RV: Pl. **14,** 134, fig. 1), **103074(e)** (paratype, ♂ car: Pl. **14,** 134, fig. 2), **103074(d)** (paratype, ♂ RV: Pl. **14,** 134, fig. 1). All of the figured specimens are from the type locality and horizon.

Diagnosis: Distinct sexual dimorphism. Females medium-sized, rounded-rectangular in lateral view and cordate in dorsal view with the greatest width posteriorly. Males small, elongate in lateral view and oval in dorsal view with the greatest width at mid-length. Larger left valve overlaps right valve. Surface reticulate. Females have a very faint trace of a dorsal sulcus which is not seen in any of the males. Two to four rows of very fine pits occur marginally and are well seen along the dorsal

Explanation of Plate 14, 132

Figs. 1, 3, ♀ car., RV (holotype, **103074(a),** 480μm long): fig. 1, ext. lat., fig. 3, int. lat. Fig. 2, ♀ car. (paratype, **103074(b),** 480μm long).

Scale A (200μm; × 134), figs. 1–3.

margins of the valves in dorsal view (Pl. **14,** 132, fig. 2: Pl. **14,** 134, fig. 2). Each valve develops five tubercles anteriorly and four or five posteriorly. These are constant in position and there is no difference between the sexes. Hinge merodont, right valve with a long, smooth anterior toothplate, a shorter, thicker, smooth posterior toothplate and slightly sinuous interconnecting groove. Right valve free margin with strong selvage and posteroventrally the valve bulges down well below the valve margin. Typical cytheracean muscle scar pattern with a row of four adductor scars, the outer two oval, the central two very elongated. Two small, rounded mandibular scars occur anteroventrally.

Remarks: This species is very similar to *Metacypris changzhouensis* Chen (*Acta Palaeon. Sinica,* **13**(1), 7, pl. 2, figs. 9, 13, 1965) but in the latter the tubercles lack the constancy and regular distribution seen in *M.aphthosa. M.changzhouensis* differs further in that the right valve is larger than the left valve, and in addition it is also a bigger species (length 680μm). Differences are also apparent in dorsal view when the posterior part of the carapace is compared. It also differs from *Metacypris unibulla* Hou & Chen (*Acta Palaeon. Sinica,* **13**(1), p. 9, pl. 1, figs. 5, 9 1965) because the latter only has one posterior tubercle, is thinner in dorsal view and differs in size amongst other things. The present species differs from *Metacypris cordata* Brady & Roberston (Brady and Roberston, *Ann. Mag. nat. Hist.,* Ser. **4. 6,** 19–20, pl. VI, figs. 1, 9, 1870; Pinto & Sanguinetti, *Esc. Geol. P. Alegre,* **4,** pl. II, figs. 1 a–e, 1962; Colin & Danielopol, *Palaebiologie Continetale,* **XI, 1,** 29–30, pl. 14, figs. 5–9, 1980), in that in the latter the right valve is the larger, there is no surface tuberculation and it is longer and narrower than *Metacypris aphthosa* which is a short and very inflated species.

Males, females and younger instars are all found together in the deposits examined although the females are more than twice as abundant as the males and instars together.

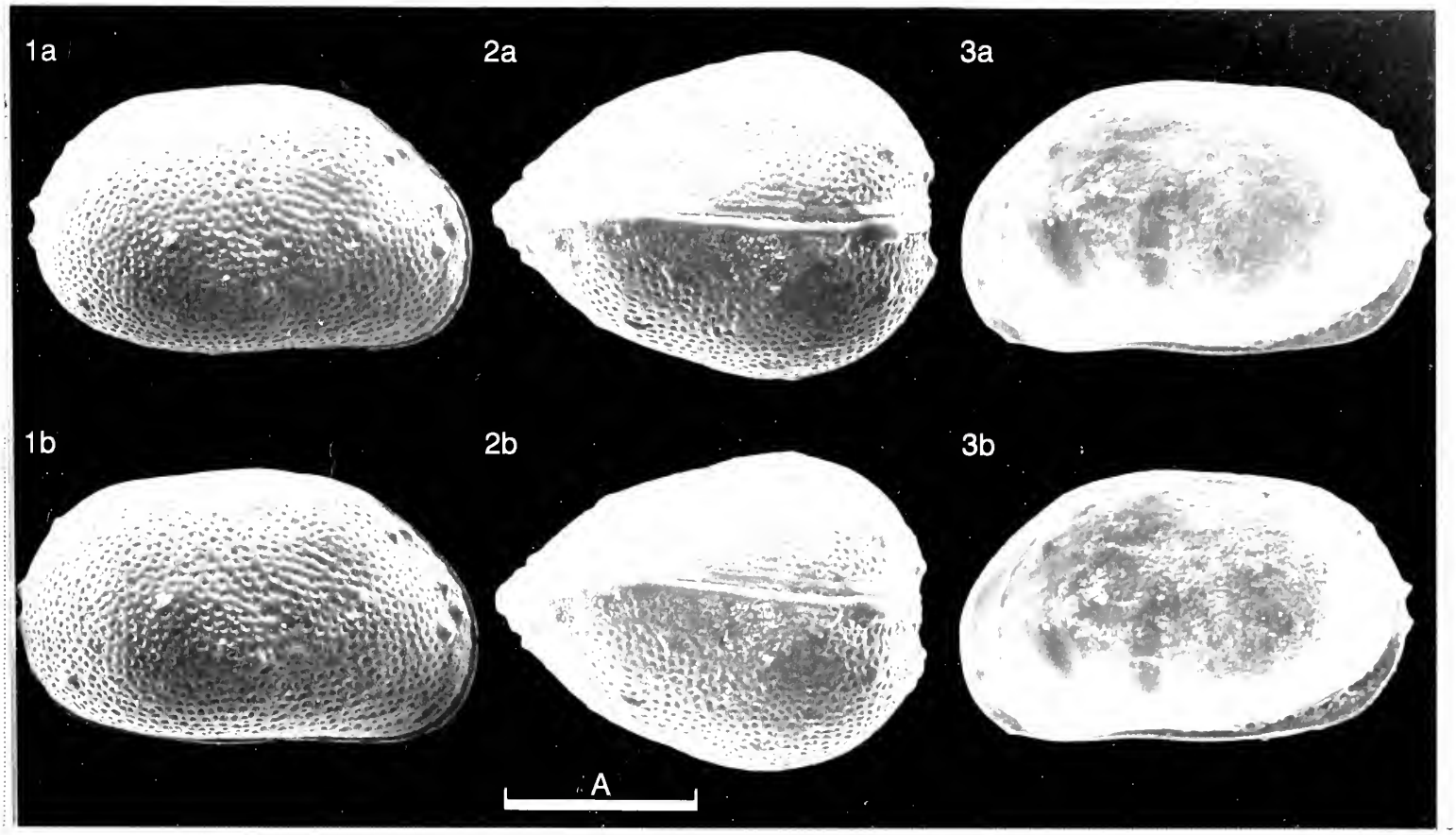
Distribution: *M.aphthosa* has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

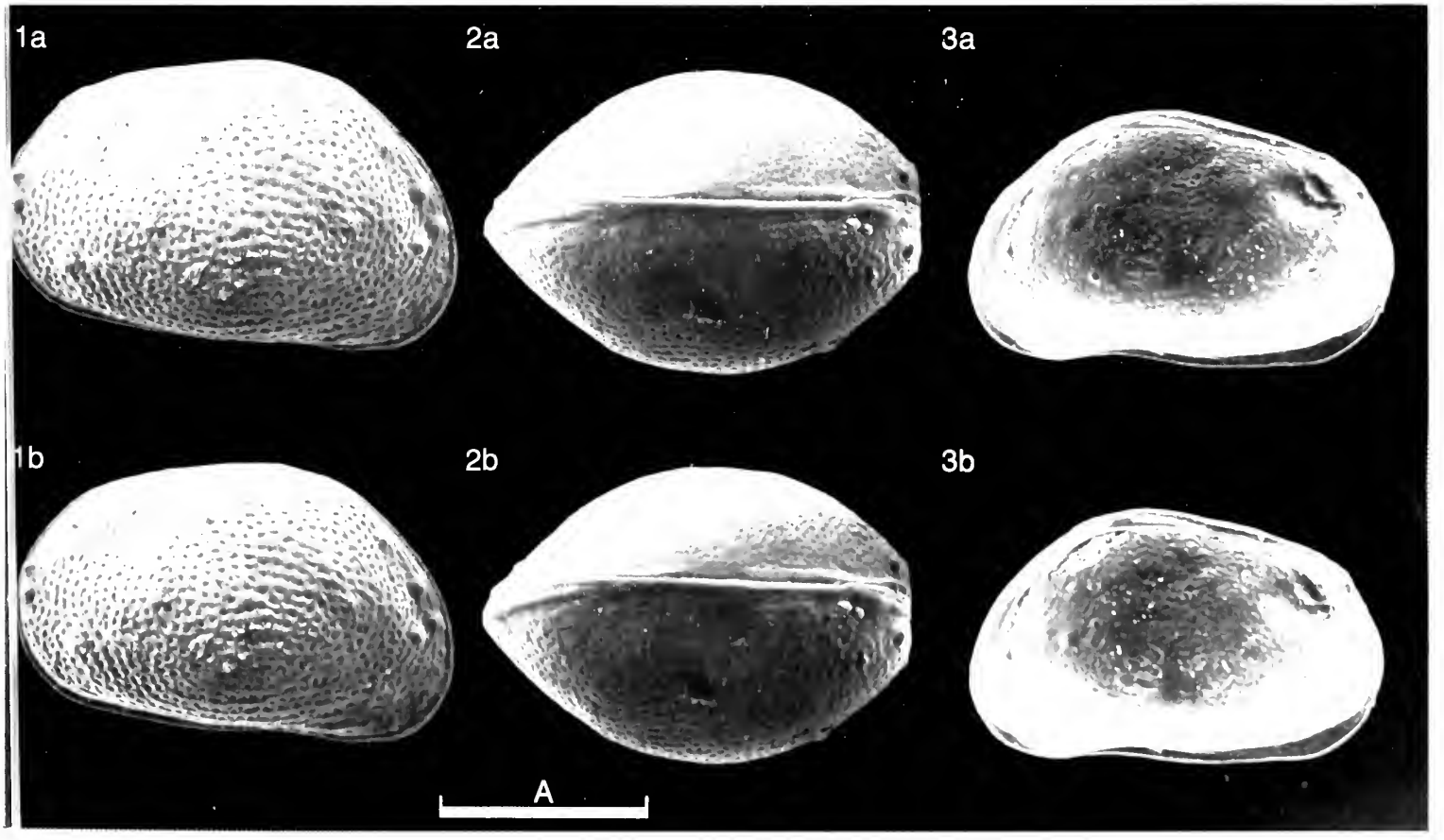
Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 134

Fig. 1, ♂ RV, ext. lat. (paratype, **103074(c),** 440μ long); fig. 2, ♂ car., dors (paratype, **103074(e),** 400μm long); fig. 3, ♂ RV, int. lat. (paratype, **103074(d),** 420μm long).

Scale A (200μm; × 146), figs. 1–3.


1a
2a
3a
1b
2b
3b
A


1a
2a
3a
1b
2b
3b
A

595.337.14 (116.333) (669 : 161.001.06) : 551.35

ON *BENINEA IBECETENENSIS* APOSTOLESCU gen. et sp. nov.

by Vespasian Apostolescu
(5, rue J. -C. Bézanier, 78360-Montesson, France)

Genus *BENINEA* gen. nov.

Type-species: *Beninea ibecetenensis* sp. nov.

Derivation of name: from Benin, W Africa.

Diagnosis: Cytheridae essentially characterized by its hinge. Right valve: anterior element consisting of a strong, rounded tooth, a long crenulate groove and a posterior plate-like cardinal element bearing five strong crenulations; left valve: large anterior socket, long crenulate ridge slightly arched and a posterior strongly crenulate socket. No accommodation groove.

Carapace subovoid in side view, elongate ovate dorsally. Anterior margin broadly rounded, posterior margin obliquely rounded. Left valve larger than right; dorsal margin regularly arched, with greatest height in middle part. Anterior margin of right valve more angular. Surface smooth with well developed normal sieve-type pore-canals. Eye tubercle absent. Sexual dimorphism pronounced; males more elongate than females.

Central muscle scars: vertical row of four coalescent rounded scars and two equally rounded scars in front (Text-fig. 1).

Narrow marginal zone; line of concrescence coincides with the inner margin. Radial pores straight, simple and up to eight on anterior margin (Text-fig. 1).

Remarks: Externally, *Beninea* is comparable to *Bopaina* Apostolescu, 1961 and *"Clithrocytheridea" senegali* Apostolescu, 1961 from the Senonian of Senegal (*Rev. Inst. franç Pétrole,* **16,** (7–8), 779–867). Except for the absence of an accommodation groove and the median ridge on the left valve, the hinge of *Beninea* is close to *Apatocythere* Triebel, 1940 (*Senckenbergiana,* **22,** (3/4), 160–227),

Explanation of Plate 14, 136

Fig. 1, ♂ car., rt. lat. (paratype, **P–351,** 560μm long); fig. 2, ♀ car., rt. lat. (holotype, **H–350,** 510μm long); fig. 3, ♀ car., lt. lat. (holotype, **H–350,** 510μm long).

Scale A (200μm; × 110), fig. 1; scale B (200μm; × 120), fig. 2; scale C (200μm; × 130), fig. 3.

Remarks: (cont.) *Dordoniella* Apostolescu, 1955 (*Cah. géol.,* **33,** 329–330), and *Schulapacythere* Malz, 1970 (*Senckenbergiana,* **51,** (5/6), 401–409). In external view, *Beninea* differs from these genera by the shape of the carapace and the absence of an eye tubercle.

Beninea ibecetenensis sp. nov.

Holotype: V. Apostolescu Collection, Lab. Micropaleontol., Mus. natl. Hist. nat., Paris, France, no. **H–350;** ♀ carapace.

[*Paratypes:* 12 carapaces and valves; same repository as holotype].

Type locality: Ibeceten borehole (at 181–182m), near the town of Anthieme, Nigeria, Benin, W Africa (see Apostlescu, 1961, *Rev. Inst. franç Pétrole,* **16** (7–8), tab. 3, 786); early Senonian, Cretaceous.

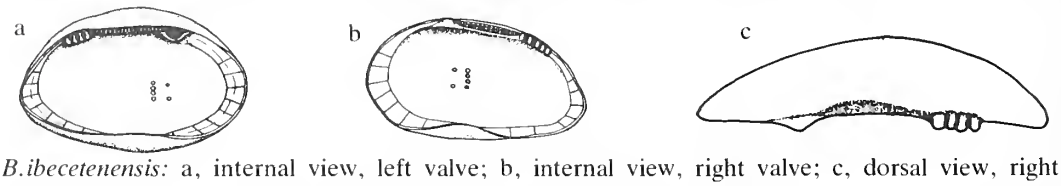
Derivation of name: From the bore-hole Ibeceten, the type locality.

Figured specimens: Mus. natl. Hist. nat. Paris, France, V. Apostolescu Collection, no. **H–350** (holotype, ♀ car.: Pl. **14,** 136, figs. 2, 3), **P–351** (paratype, ♂ car.: Pl. **14,** 136, fig. 1; Pl. **14,** 138, fig. 1), **P–352** (paratype, ♀ LV: Pl. **14,** 138, fig. 2), **P–353** (paratype, ♀ RV: Pl. **14,** 138, fig. 3). All from the type-locality, Ibeceten borehole (at 181–182m), Benin, W Africa. Early Senonian, occurring together with other ostracodes such as *Cophinia apiformis* (Reyment, 1960).

Diagnosis: As for the genus.

Distribution: Early Senonian, Cretaceous, of the Benin-Togo basin, W Africa.

Acknowledgment: Dr. J. P. Colin, Esso Production Research-European Lab. (Bégles) is thanked for providing the S.E.M. micrographs (taken by C. Lété) and for reading the text.

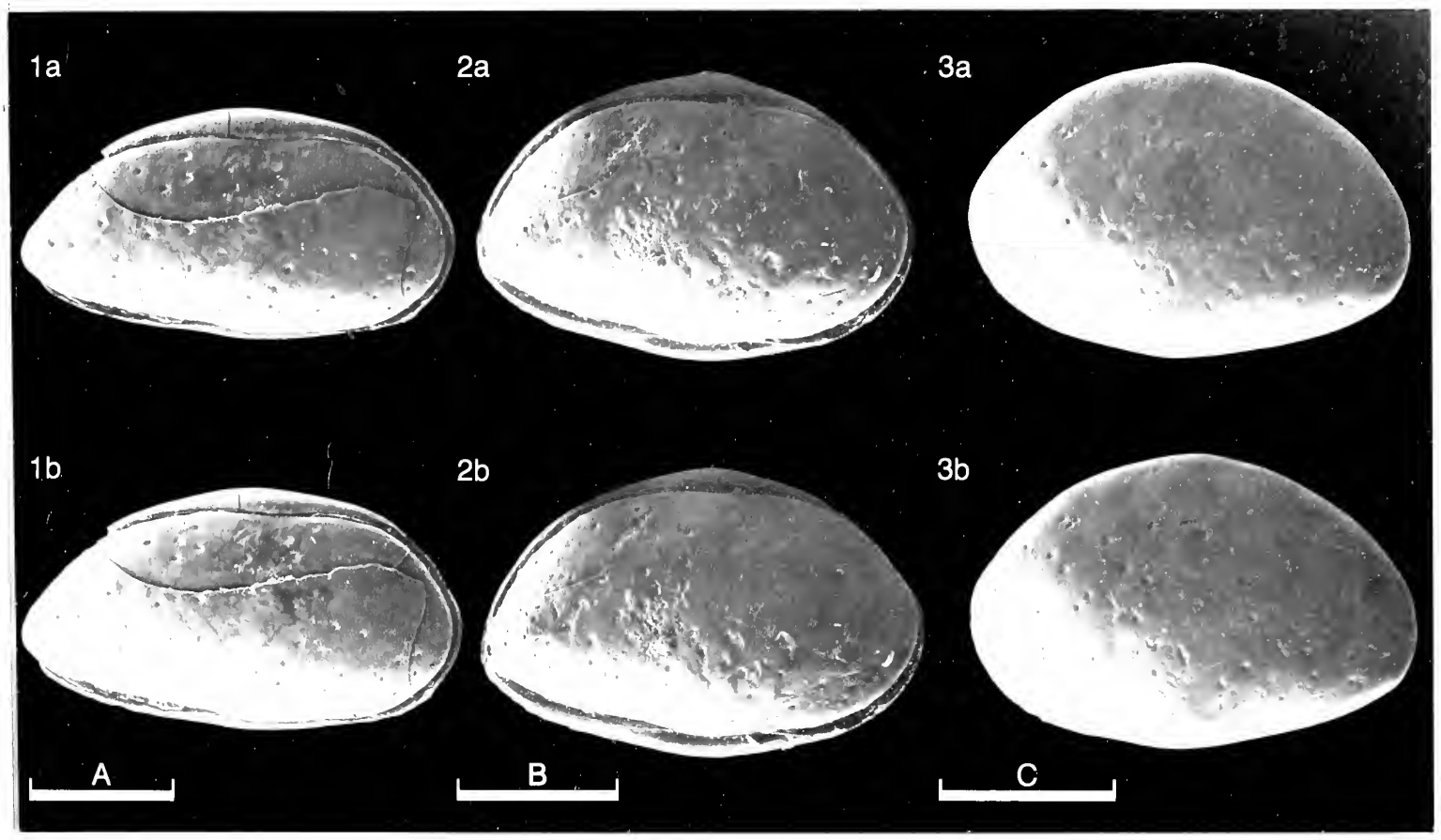


Text-fig. 1. *B.ibecetenensis:* a, internal view, left valve; b, internal view, right valve; c, dorsal view, right valve.

Explanation of Plate 14, 138

Fig. 1, ♂ car., ext. dors. (paratype, **P–351,** 560μm long); fig. 2, ♀ RV, int. lat. (paratype, **P–352,** 480μm long); fig. 3, ♀ LV, int. lat. (paratype, **P–353,** 490μm long).

Scale A (200μm; × 110), fig. 1; scale B (200μm; × 120), fig. 2; scale C (200μm; × 130), fig. 3.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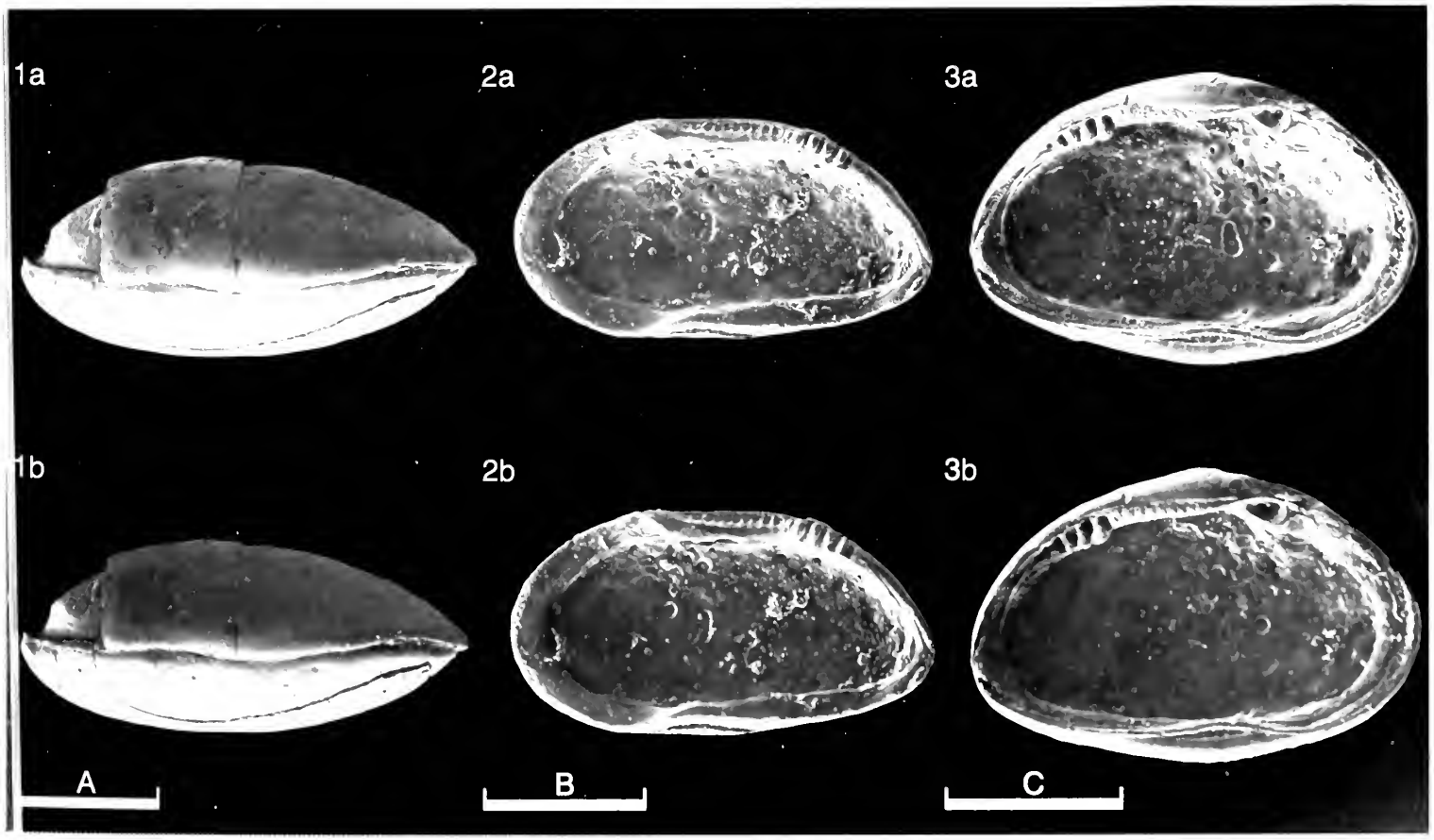
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ON *GLYPTOLICHVINELLA SPIRALIS* (JONES & KIRKBY)

by Robert F. Lundin
(Arizona State University, Tempe, U.S.A.)

Genus *GLYPTOLICHVINELLA* Pozner, 1966

Type-species (by original designation): *Kirkbya spiralis* Jones & Kirkby, 1884

Diagnosis: Cytherellacean genus the lateral surfaces of which are ornamented with two ridges, one which is subparallel to the lateral outline and may or may not continue to form a marginal ridge, and another which is median and bends below the adductorial sulcus. Straguloid process variably developed. Domatium with variable number of separate egg compartments.

Remarks: The earliest valid publication of this genus known to me is that of K. Ya. Gurevich (in *Fossil Ostracoda*, O. S. Vyalov, ed., *Acad. Sci. Ukr. SSR, Inst. Geol. & Geochem. Fossil Fuels, 1966 = Israel Program for Scientific Translations*, 1971 English translation of Russian original). In that publication, Pozner is credited with authorship of the genus and the generic name is spelled *Glyptolichvinella* rather than *Glyptolichwinella* as it appears in various other literature. Accordingly, the former spelling is used here.

Lichvinella scopinensis Pozner (*op. cit.*) is the type-species for *Lichvinella*. M. N. Gramm (Vladivostok) has provided me with two photographs of *L.scopinensis*, one of which shows that the females of that species have egg compartments and a limen. The discovery of egg compartments in *Glyptolichvinella* indicates, therefore, that this genus differs from *Lichvinella* only by the presence of a separate longitudinal ridge on the lateral surface of each valve. I judge this to be only a species-level difference but do not formally synonymize the two genera until more and better material of each can be studied.

Explanation of Plate 14, 140

Fig. 1, ♂ car., ext. lt. lat (**BMNH I 1719,** [*pars*], 1030μm long); fig. 2, ♀ car., ext. rt. lat., light photograph to show egg compartments (**BMNH I 1719,** [*pars*], 880μm long); fig. 3. ♀ car., ext. lt. lat. (**BMNH OS 7384,** 1240μm long).
Scale A (200μm; × 75), fig. 1; scale B (200μm; × 84), fig. 2; scale C (200μm; × 61), fig. 3.

1884 *Kirkbya spiralis* sp. nov.; T. R. Jones & J. W. Kirkby, *Berwickshire Nat. Club, Hist.*, **10,** (1882–1884), 323, pl. 2, figs. 12, 13.
1885 *Kirkbya spiralis*, Jones & Kirkby; T. R. Jones & J. W. Kirkby, *Ann. Mag. nat. Hist.*, ser. 5, **15,** 184, pl. 3, fig. 11.
1978 *Glyptolichvinella spiralis* (Jones & Kirkby, 1884); E. Robinson, *in* Bate, R. H. & Robinson, J. E. (eds.), A Stratigraphical Index of British Ostracoda, *Geol. J. Spec. Issue*, **8,** 138, pl. 5, fig. 4, table 2.

Type specimens: Apparently are lost. British Museum (Nat. Hist.) **I 2554,** identified (slide information) as primary types of *Kirkbya spiralis* Jones & Kirkby and "*Leperditia subrecta*, Portlock", consist of two rock chips with many leperditiid specimens but none of *Kirkbya spiralis*. Under present knowledge of the species, it is premature to designate a neotype.

Type locality: Lower Carboniferous (Dinantian) limestone on the coast near Randerstone, Fifeshire, Scotland.

Figured specimens: British Museum (Nat. Hist.), **OS 7384** (♀ car.: Pl. **14,** 140, fig. 3), **I 1719** (*pars*) (♂ car.: Pl. **14,** 140, fig. 1), **I 1719** (*pars*) (♀ car.: Pl. **14,** 140, fig. 2; Pl. **14,** 142, figs. 1, 2). **OS 7384** is from Megg's Linn (Lower Asbian, Dinantian), Lewisburn, North Tyne, Northumberland, England; approx. lat. 55° 10′N, long. 2° 20′W. Specimens **I 1719** are from Lower Carboniferous (Dinantian) "Calcareous Sandstone Series, at Linnhouse Water, Linlithgowshire", Scotland; approx. lat. 56° N, long. 3° 40′ W. **I 1719** contains six carapaces (two figured herein).

Diagnosis: *Glyptolichvinella* species with spiral ridge along entire margin which at midlength of dorsum runs anteroventrally and then parallels anterior, ventral, posterior and posterodorsal margins, terminating just behind the adductorial sulcus. Separate longitudinal ridge on lateral surface bends below adductorial sulcus. Anterior straguloid process weak. Adult females with five (perhaps more or less) oval to circular egg compartments in each valve. Surface granulose.

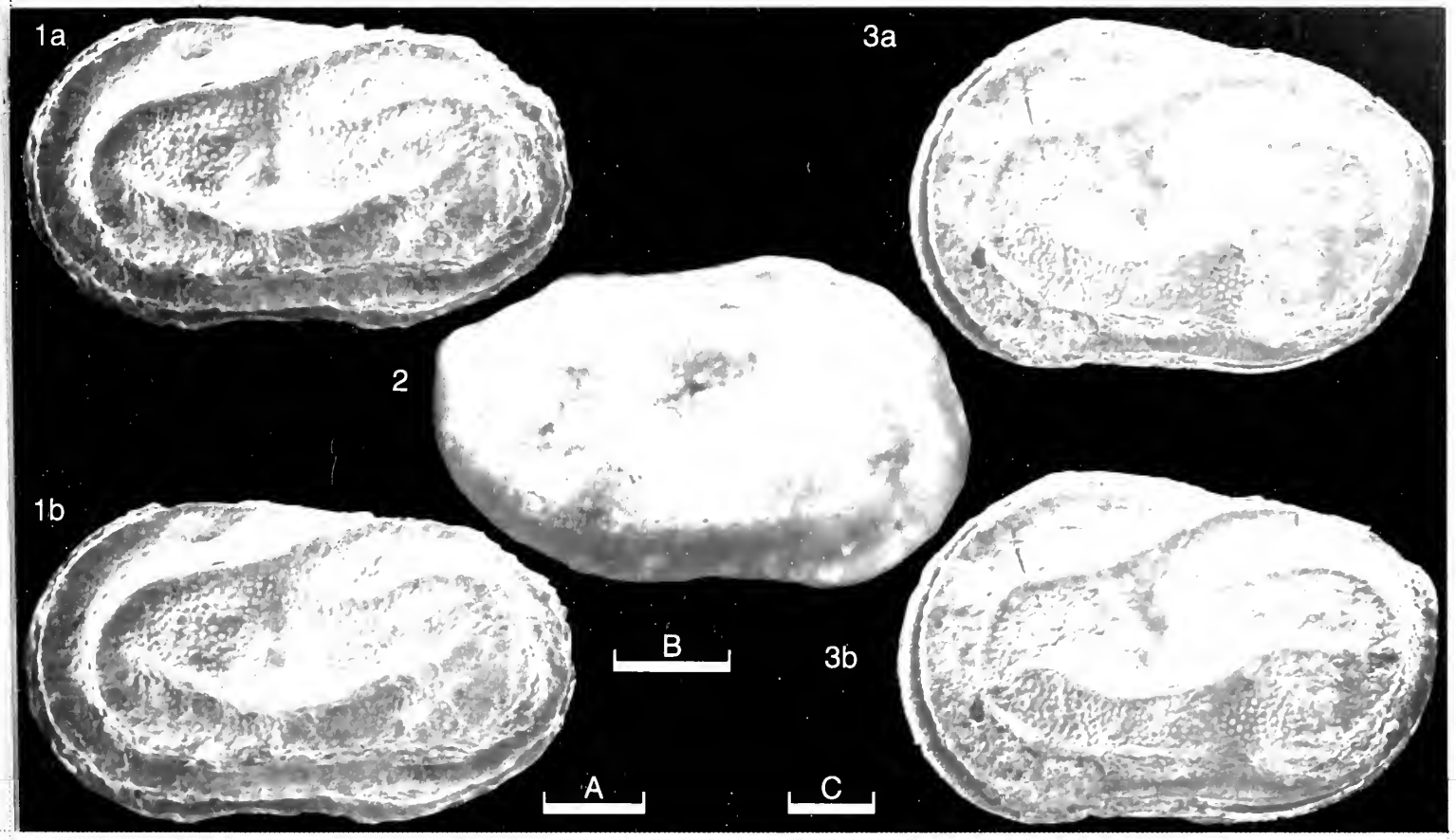
Remarks: Along with the report of Lundin & Visintainer (*Stereo-Atlas Ostracod Shells,* **14** (33), 143–148, 1987) on *G. ovicella*, this is the first report of egg compartments in the domatium of females of this genus. Only 7 specimens (carapaces) of *G. spiralis* have been available to me. All are damaged and the 3 illustrated here provide impressions of the species only in the lateral views shown.

Distribution: Known from Lower Carboniferous (Viséan) of Scotland and England (see Robinson, 1978, *op. cit.*) Reported also from the Lower Carboniferous of the USSR (see Gurevich, 1966, *op. cit.*).

Acknowledgement: Support from College Liberal Arts and Sciences, Arizona State Univ. is gratefully acknowledged.

Explanation of Plate 14, 142

Fig. 1, 2, ♀ car. (**BMNH I 1719,** [*pars*], 800μm long); fig. 1, ext. rt. lat.; fig. 2 ext. rt. lat. (median and mid-anterior areas).
Scale A (200μm; × 88), fig. 1; scale B (50μm; × 164), fig. 2.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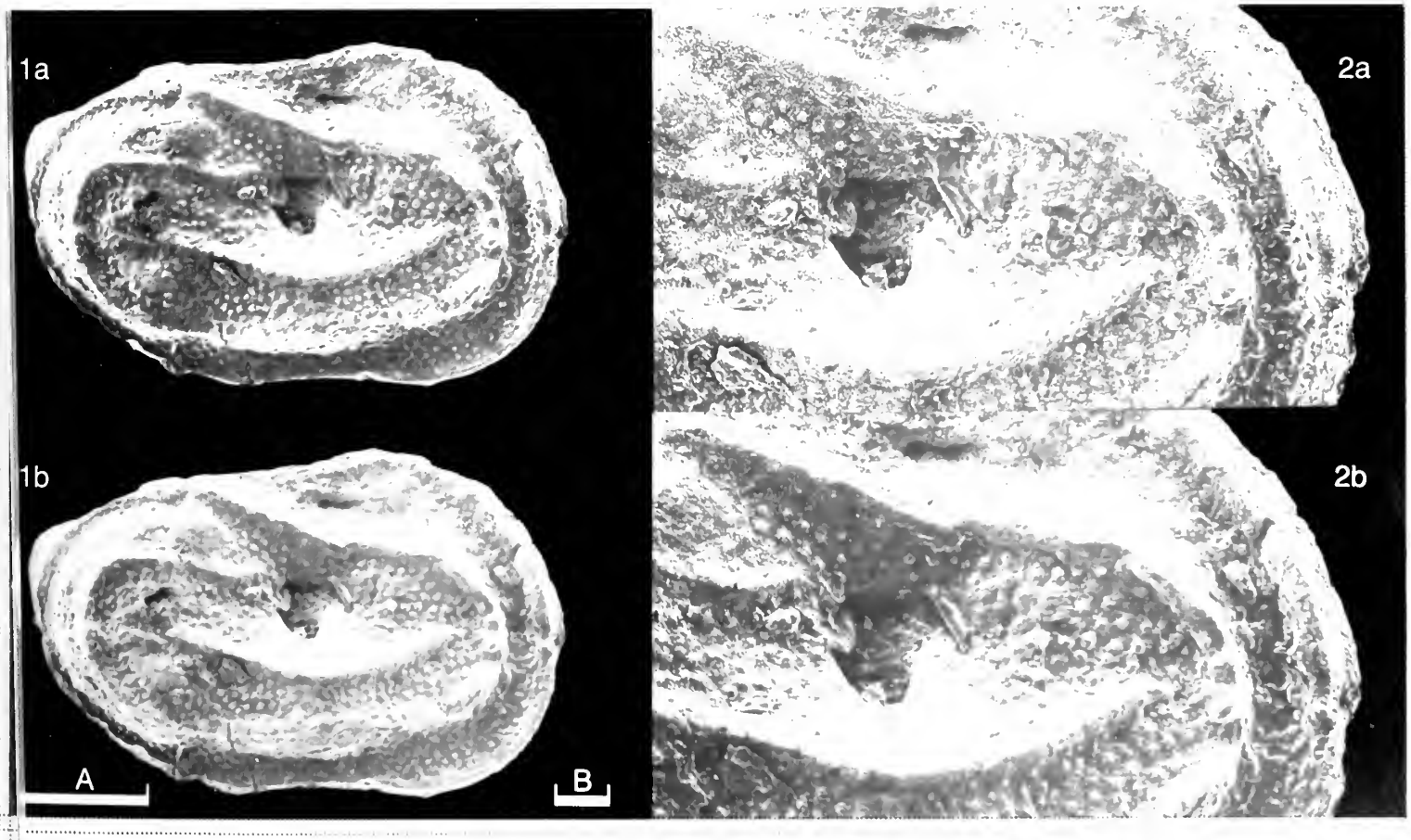
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ON *GLYPTOLICHVINELLA OVICELLA LUNDIN & VISINTAINER sp. nov.*

by Robert F. Lundin & Linda M. Visintainer
(Arizona State University, Tempe, U.S.A.)

Glyptolichvinella ovicella sp. nov.

Holotype: Department of Geology, Arizona State University (ASU), no. **ASU X–91;** ♀ car.

Type locality: White Hill no. 1 borehole, Canning Basin, Western Australia; latitude 21° 9′ 20.35″S, longitude 127° 35′ 14.98″E. Holotype from interval 1520–30m below top of borehole in rocks of probable Famennian age, Devonian. Other figured and studied specimens from samples ranging from 1080–2890m below top of borehole.

Derivation of name: Latin *ovum*, egg, and *cella*, chamber; referring to the presence of egg compartments.

Diagnosis: *Glyptolichvinella* species with one ridge paralleling the margin and a longitudinal ridge approximately at midheight which bends below S_2. Females with distinct domatium having three to six separate egg compartments in each valve.

Figured specimens: Department of Geology, Arizona State University (ASU), nos. **X–91** (holotype, ♀ car.: Pl. **14,** 144, fig. 1; Pl. **14,** 146, fig. 7), **X–97** (♀ car.: Pl. **14,** 144, fig. 2), **X–93** (♀car.: Pl. **14,** 144, fig. 3), **X–92** (tecnomorphic car.: Pl. **14,** 146, figs. 1, 2), **X–100** (♀ car.: Pl. **14,** 146, fig. 3), **X–94** (♀ car.: Pl. **14,** 146, fig. 6), **X–99** (♀ car.: Pl. **14,** 146, fig. 5), **X–98** (♀ car.: Pl. **14,** 146, fig. 4). All specimens from the type locality but from various stratigraphic levels (see *Type locality*).

Explanation of Plate 14, 144

Fig. 1, ♀ car., ext. lt. lat. (holotype, **ASU X–91,** 600μm long); fig. 2, ♀ car., ext. lt. lat. (**ASU X–97,** 730μm long); fig. 3, ♀ car., ext. rt. lat. (**ASU X–93,** 660μm long).

Scale A (200μm; × 86), fig. 1; scale B (200μm; × 76), fig. 2; scale C (200μm; × 84), fig. 3.

Remarks: *Glyptolichvinella ovicella* is readily distinguished from *G. spiralis* (= *Kirkbya spiralis* Jones & Kirkby, 1884; see Jones & Kirkby, *Ann. Mag. nat. Hist.*, 5, **15,** 184, 1885) by differences in the lateral ridges, and from *G. nodosovidera* Crasquin, 1983 (see Crasquin, *Ann Soc. Géol. Nord.* **CII,** 191–204, 1983) by differences in the lateral ridges and by the absence of eye tubercles.

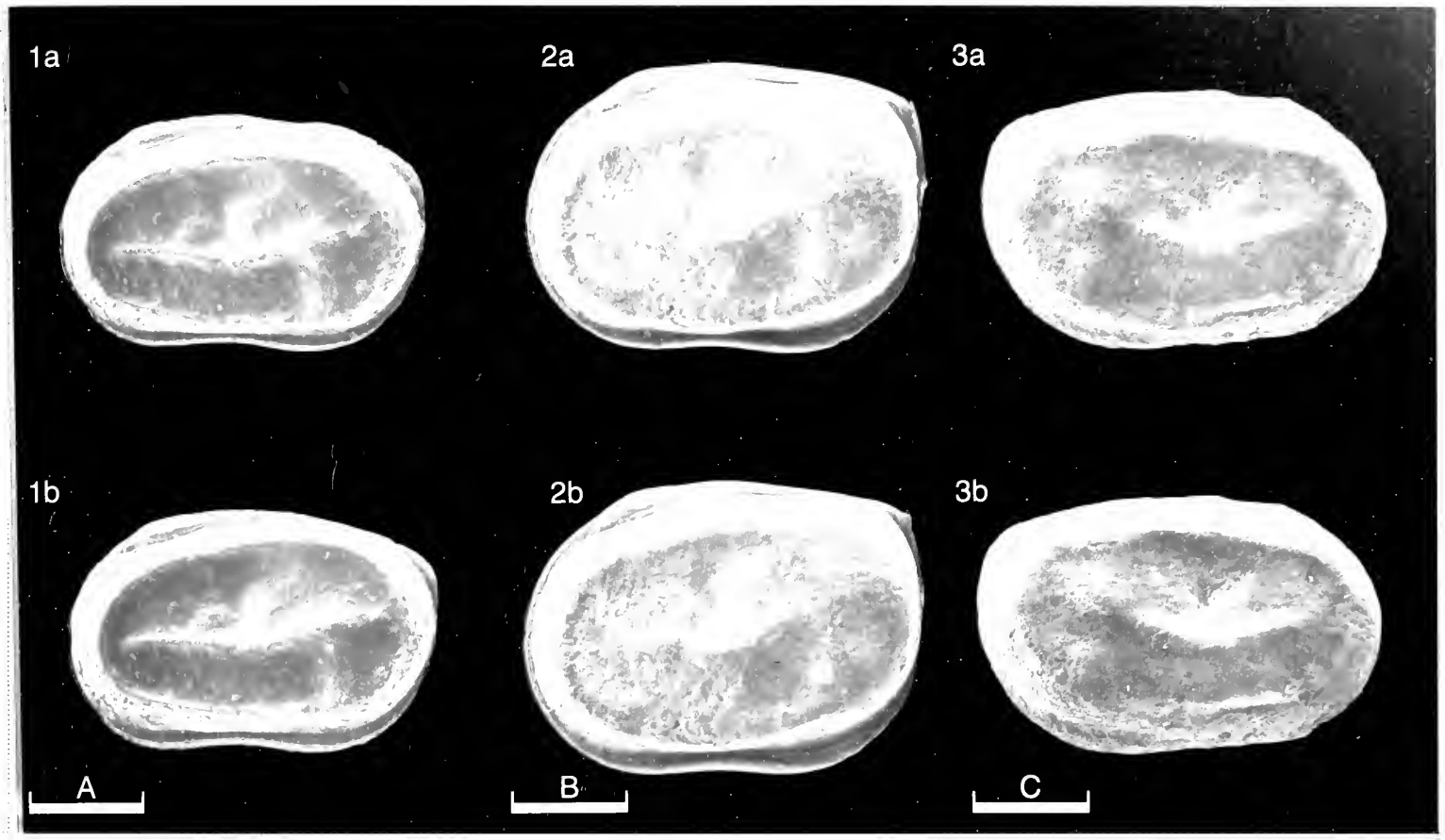
This is the first report of separate compartments to house eggs for this genus. Lundin (see *Stereo-Atlas of Ostracod Shells,* **14** (32), 139–142, **1987**) reports similar egg compartments in the type-species, *G. spiralis* (Jones & Kirkby, 1884) and we conclude, therefore, that this is a generic character which needs to be verified in other species of the genus. The number of egg compartments per valve varies from three to six and no carapace studied has more than eleven or fewer than six. Normally the number of egg compartments in each valve of a carapace is equal, but in some cases the right valve has one more compartment than the left valve. There is no systematic change in the number of egg compartments per specimen through the 1810m-interval from which the studied specimens were derived.

Except for one adult tecnomorphic left valve and one juvenile tecnomorphic right valve, all specimens studied are complete carapaces. We cannot, therefore, definitively demonstrate the existence of a limen in the females. An exterior depression at the anteroventral edge of the domatium suggests a limen is present. The presence of a well-developed anterior straguloid process and the morphology of the contact margin and hinge of the two isolated valves available for study further indicate that *Glyptolichvinella* is a typical platycope ostracode.

Explanation of Plate 14, 146

Fig. 1, tecnomorphic car. ext. rt. lat. (**ASU X–92,** 580μm long); fig. 2, tecnomorphic car., ext. dors. (**ASU X–92,** 580μm long); fig. 3, ♀ car., ext. lt. lat. (**ASU X–100,** 640μm long); fig. 4, ♀ car., ext. lt. lat. (**ASU X–98,** 640μm long); fig. 5, ♀ car., ext. rt. lat. (**ASU X–99,** 660μm long); fig. 6, ♀ car., ext. dors. (**ASU X–94,** 850μm long); fig. 7, ♀ car., ext. vent. (holotype, **ASU X–91,** 600μm long).

Scale A (200μm; × 96), figs. 1, 2; scale B (200μm; × 81), fig. 3; scale C (200μm × 87), fig. 4; scale D (200μm; × 86), fig. 5; scale E (200μm; × 64), fig. 6; scale F (200μm; × 91), fig. 7.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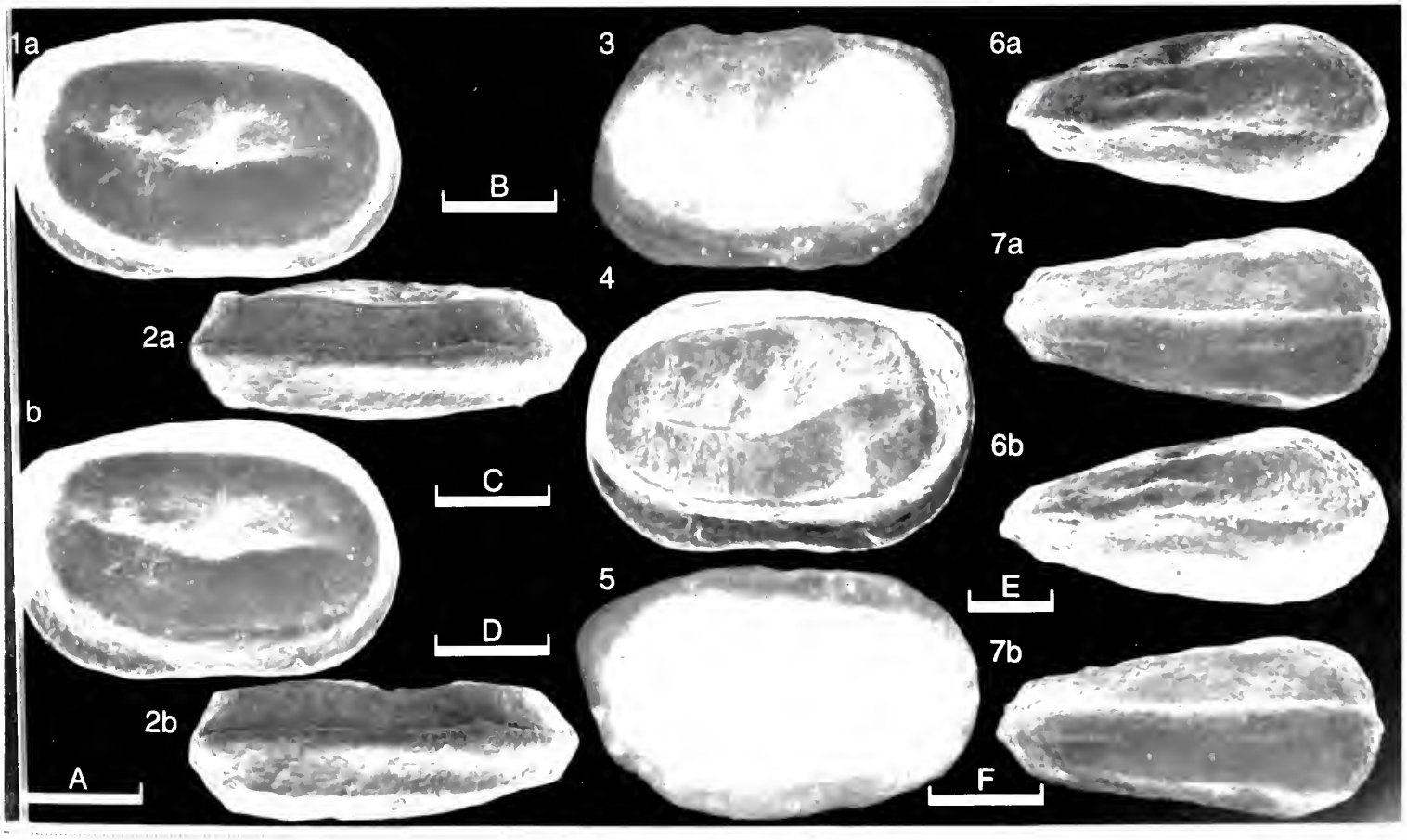
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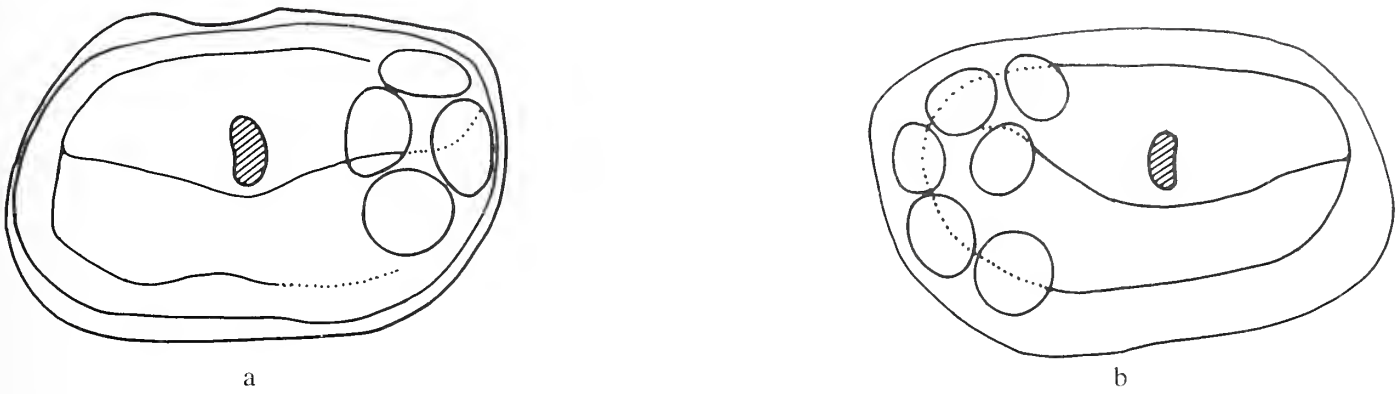
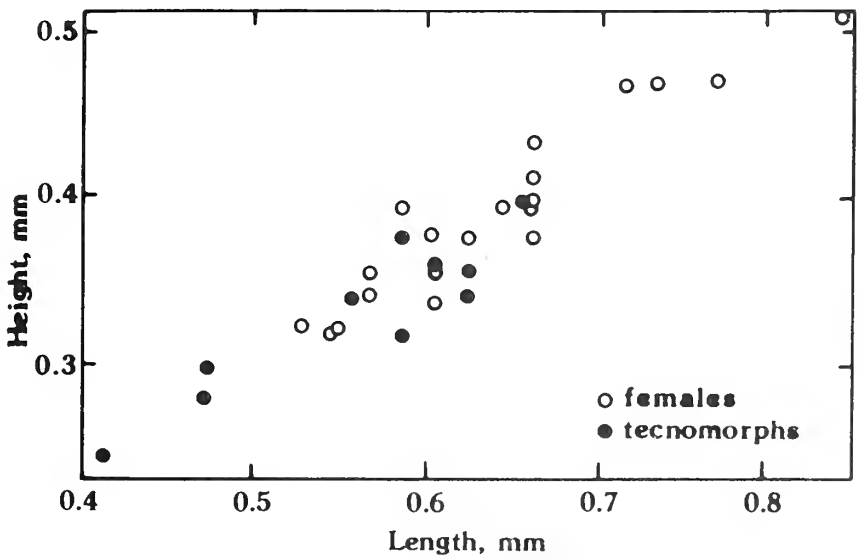
Distribution: Known only from the type locality. The stratigraphic interval containing this species is certainly, in part (if not entirely), late Devonian (Frasnian and/or Famennian) but it possibly ranges into the early Carboniferous.

Acknowledgments: We gratefully acknowledge the help of Lee B. Gibson, David Ford, Mobil Exploration & Producing Services, Inc. and the support of the College of Liberal Arts and Sciences, Arizona State University.



Text-fig. 1 Drawings to show ornamentation and position of egg compartments in *G.ovicella*: a, specimen **ASU X–100** (Pl. 14, **146,** fig. 3); b, specimen **ASU X–99** (Pl. 14, **146,** fig. 5).



Text-fig. 2 Size dispersion diagram of thirty specimens of *G.ovicella* from nine stratigraphic intervals in White Hill no. 1 borehole, Western Australia.

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See **1** (2) 5–22 **(1973)** for explanation of the Schedules in the Universal Decimal Classification

Stereo-Atlas of Ostracod Shells: Vol. 14, Part 2

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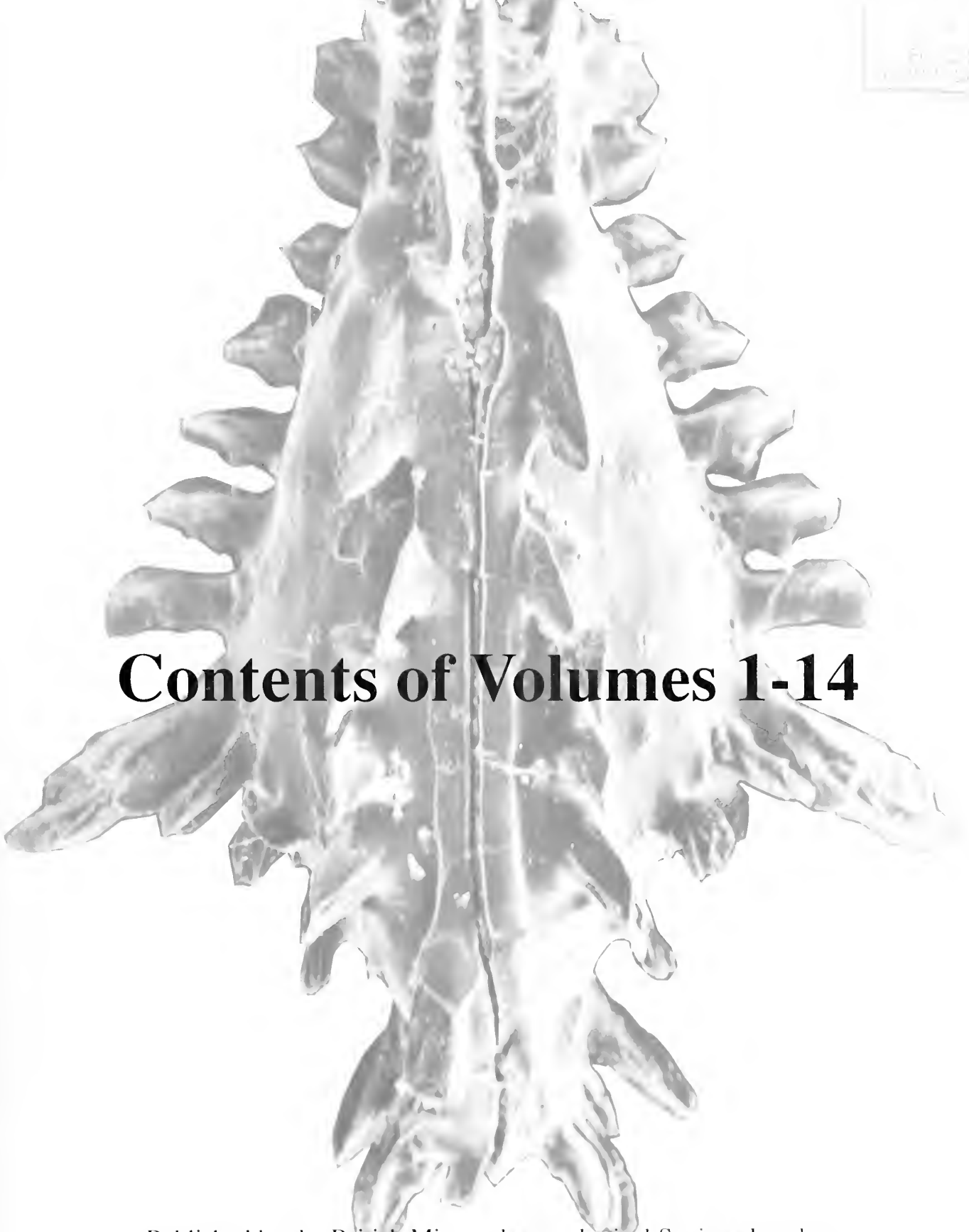

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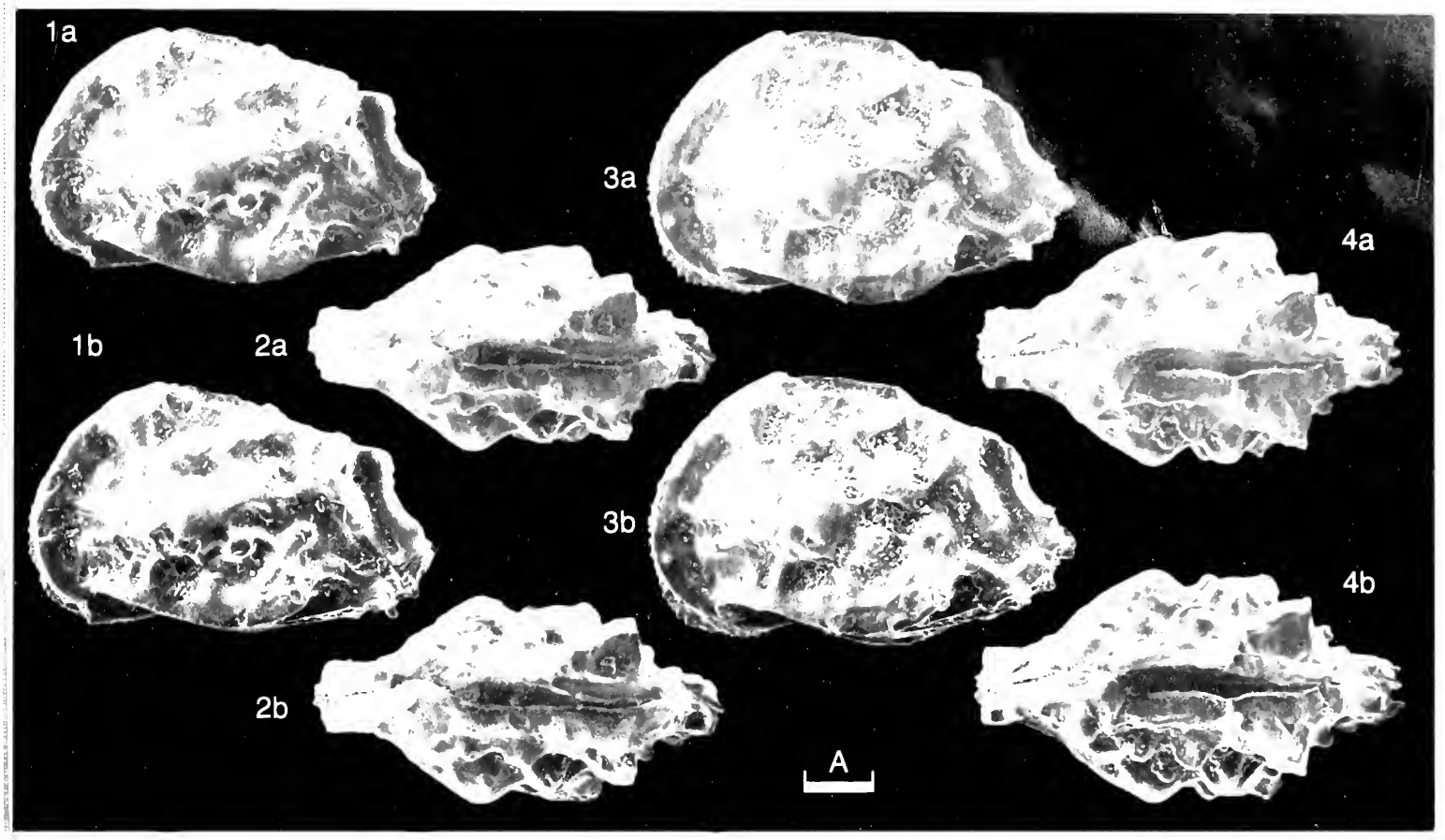
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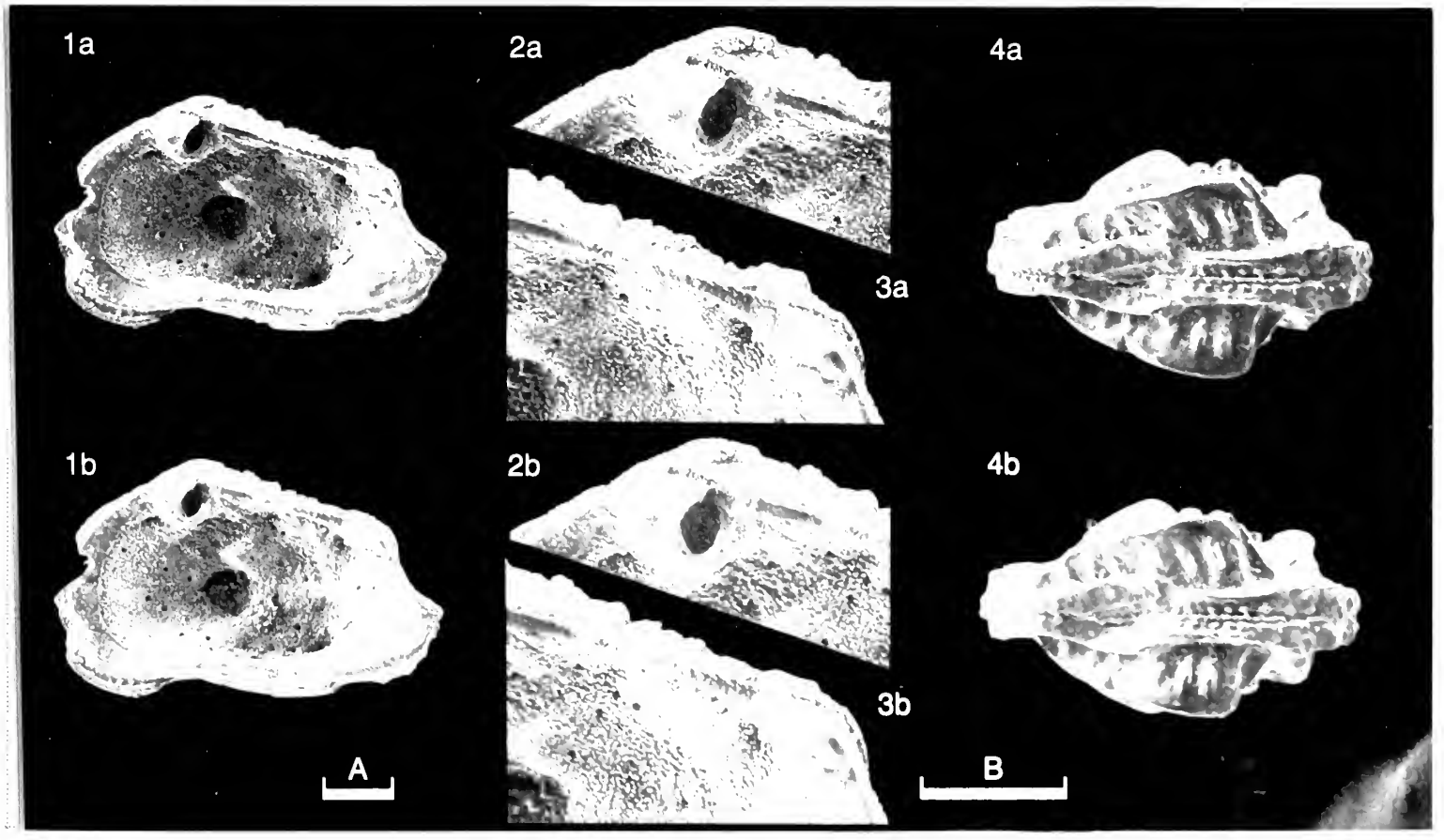
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Healdianella? aremorica Crasquin
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Bairdia aselfingensis Lord and Moorley
Bairdia luhni Lord and Moorley
Cytherelloidea longicostata Sheppard
Marslatourella dorsispinata Bate & Stephens
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Marslatourella bullata Bate
Micropneumatocythere tumida Stephens & Ware
Monoceratina scrobiculata Triebel & Bartenstein
Ogmoconcha ambo Lord and Moorley
Ogmoconcha eocontractula Park
Oligocythereis kostytschevkaensis (Lyubimova)
Procytheridea exempla Peterson
Procytheridea fraudator Sherrington & Lord
Procytheropteron prolongatum (Sharapova)
Progonocythere reticulata Bate
Progonocythere stilla Sylvester-Bradley
Ptychobairdia limbata Sheppard
Terquemula robusta Sheppard
Theriosynoecum bathonicum Sylvester-Bradley
Theriosynoecum kirtlingtonense Bate
Theriosynoecum wyomingense (Branson)
Timiriasevia mackerrowi Bate
Timiriasevia punctata Clements
Trachycythere munita Sylvester-Bradley

Cretaceous

Acrocythere hauteriviana (Bartenstein)
Apatocythere spinosa Neale
Apateloschizocythere geniculata Bate
Archeocosta alkazwinii Al-Bashir & Keen
Beninea ibecetenensis Apostolescu
Cythereis lindiensis Bate
Donmacythere damottae (Colin)
Iberocypris cornutus Babinot
Kefiella maresi Donze & Said
Maghrebeis tuberculata Majoran
Navarracythere estellensis Colin & Rodriguez-Lazaro
Nigeroloxoconcha oyesesei Reyment
Nigeroloxoconcha oniseguni Reyment
Paracandona occitanica Babinot & Tambareau
Paranotacythere speetonensis (Neale)
Paranotacythere (Paranotacythere) magnifica Lomax
Parapokornyella taxyae (Babinot)
Pennyella pennyi Neale
Pattersoncypris micropapillosa Bate
Philomedes donzei Neale
Sarlatina merlensis Babinot & Colin
Schuleridea bilobata (Triebel)
Schuleridea hanni (Triebel)
Schuleridea juddi Neale
Schuleridea lamplughi Neale
Schuleridea praethoerenensis Bartenstein & Brand
Schuleridea rhomboidalis Neale
Spinoleberis eximia (Bosquet)
Stravia crossata Neale
Theriosynoecum fittoni (Mantell)
Veenia (Nigeria) nigeriensis Reyment

Tertiary

Abrotocythere quinquicornis Zhao
Abrotocythere ovata Zhao
Acanthocythereis decoris Siddiqui
Acanthocythereis dohukensis Khalaf
Acanthocythereis hystrix (Reuss)
Actinocythereis iraqensis Khalaf
Ambostracon costaforma Whatley & Maybury
Ambostracon delicata Whatley & Maybury
Ambostracon europea Maybury & Whatley
Ambostracon perfecta Maybury & Whatley
Argenticytheretta (Argenticytheretta) fuegoensis Rose
Argenticytheretta (Argenticytheretta) gonzalezi Rose
Argenticytheretta (Argenticytheretta) patagoniensis Rose
Argenticytheretta (Argenticytheretta) punctata Rose
Argenticytheretta (Argenticytheretta) riescoensis Rose
Argenticytheretta (Chiliella) brunswickensis Rose
Argenticytheretta (Magallanella) chilena Rose
Bairdia beraguaensis Singh & Tewari
Bairdia jammuensis Singh & Tewari
Bairdia kalakotensis Singh & Tewari
Bairdoppilata kalakotensis Singh & Tewari
Callistocythere mediterranea (Müller)
Kovalevskiella caudata (Lutz)
Kuiperiana robusta Whatley & Maybury
Leguminocythereis chittagongensis Neale & Ahmed
Leocytheridea polleti Keen
Leptocythere multipunctata (Seguenza)
Loculicytheretta (Heptaloculites) cavernosa (Apostolescu & Magne)
Loculicytheretta (Heptaloculites) semirugosa (Apostolescu & Magne)
Loculicytheretta (Heptaloculites) sp. A
Loculicytheretta pavonia (Brady)
Loxocauda subquadrata Maybury & Whatley
Mutilus albicans Ruggieri
Mutilus cimbaeformis (Seguenza)
Mutilus convexus (Baird)
Mutilus elegantulus Ruggieri & Sylvester-Bradley
Mutilus freudenthali (Sissingh)
Mutilus keiji Ruggieri
Mutilus retiformis (Terquem)
Mutilus speyeri (Brady)
Nigeroloxoconcha oniseguni Reyment
Nigeroloxoconcha oyesesei Reyment

Callistocythere montana Doruk
Carinocythereis antiquata (Baird)
Carinocythereis carinata (Roemer)
Chrysocythere cataphracta Ruggieri
Chrysocythere naqibi Khalaf
Chrysocythere paradisus Doruk
Cistacythereis equivalis Doruk
Cistacythereis pokornyi (Ruggieri)
Costa batei (Brady)
Costa edwardsii (Roemer)
Costa himchariensis Ahmed
Costa obliquifossa Ahmed
Costa punctatissima Ruggieri
Costa trudis Ahmad
Cyamocytheridea contracta Doruk
Cyamocytheridea meniscus Doruk
Cyamocytheridea obstipa Doruk
Cyamocytheridea polygona Doruk
Cyprideis exuberans van Harten
Cyprideis undosa van Harten
Cytherella (Cytherelloidea) chosta Doruk
Cytherella (Cytherelloidea) glypta Doruk
Cytherella (Cytherelloidea) obolus Doruk
Cytherella (Cytherelloidea) ochthodes Doruk
Cytherella (Cytherelloidea) petrosa Doruk
Cytherella (Cytherelloidea) scarabaeus Doruk
Cytherella postdenticulata Oertli
Cytheretta (Cytheretta) jurinei (V. Münster)
Cytheretta (Cytheretta) semipunctata (Bornemann)
Cytheretta (Flexus) plicata (V. Münster)
Cytheridea (Cytheridea) muelleri muelleri (V. Münster)
Cytheridea (Cytheridea) muelleri toenisbergensis Weiss
Cytheridea (Cytheridea) pernota Oertli & Keij
Hamanella implexa Finger
Haplocytheridea debilis (Jones)
Haplocytheridea mantelli Keen
Hermanites transversicostata Khalaf
Hornibrookella anna (Lienenklaus)
Howeina camptocytheroidea Hanai
Keijella clauda Doruk
Keijella dolabrata Doruk
Keijella hodgii (Brady)
Keijella procera Doruk
Ommatokrithe prolata Ahmad
Orionina bireticulata Doruk
Orionina tegminata Doruk
Paijenborchella (Eopaijenborchella) malaiensis cymbula Ruggieri
Paijenborchella (Eopaijenborchella) mouliana (Sissingh)
Palmoconcha laevata (Norman)
Paracypris jhingrani Singh & Tewari
Paracytheridea anapetes Ahmad
Paracytherideä inscita Doruk
Paracytheromorpha rimafossa Maybury & Whatley
Paragrenocythere biclavata Al-Furaih
Phalcocythere horrescens (Bosquet)
Pokornyella mersondaviesi (Latham)
Pterygocythereis vannieuwenhuisei Brouwers
Radimella confragosa (Edwards)
Roundstonia magna Maybury & Whatley
Roundstonia minima Whatley & Maybury
Sagmatocythere alaefortis alaefortis Whatley & Maybury
Sagmatocythere alaefortis gallica Whatley & Maybury
Sagmatocythere minuta Maybury & Whatley
Sagmatocythere paracercinata Whatley & Maybury
Sagmatocythere pseudomultifora Maybury & Whatley
Sagmatocythere wyatti Maybury & Whatley
Sarsicytheridea kempfi Weiss
Sarsicytheridea lienenklausi (Kuiper)
Schizocythere buendensis Triebel
Schuleridea (Aequacytheridea) oculata Moos
Semicytherura incongruens (G. W. Müller)
Semicytherura ruggierii (Pucci)
Sinocytheridea impressa (Brady)
Sylvestra posterobursa Doruk
Tanzanicythere pterota Ahmad
Thaerocythere anisomorphica Whatley & Maybury
Thaerocythere irregulare Whatley & Maybury
Thaerocythere pieta Maybury & Whatley
Thaerocythere regulare Maybury & Whatley
Togoina attitogonensis Apostolescu
Triebelina raripila (G. W. Müller)
Urocythereis favosa (Roemer)
Urocythereis labyrinthica Uliczny
Urocythereis seminulum (Seguenza)
Waiparacythereis joanae Swanson

Quaternary & Recent

Abrotocythere quinquicornis Zhao
Acanthocythereis hystrix (Reuss)
Albileberis sinensis Hou
Atjehella kingmai Keij
Aurila woodwardii (Brady)
Aurila woutersi Horne
Australicythere polylyca (Müller)
Baffinicythere howei Hazel
Bathycythere vanstraateni Sissingh
Bennelongia tunta De Deckker
Bonnyanneila robertsoni (Brady)
Bythoceratina scaberrima (Brady)
Bythocythere intermedia Elofson
Bythocythere zetlandica Athersuch, Horne & Whittaker
Caboncypris nunkeri De Deckker
Callistocythere badia (Norman)
Loxoconcha affinis (Brady)
Loxoconcha alata Brady
Loxoconcha amygdalanux Bate & Gurney
Loxoconcha conjugalis Athersuch
Loxoconcha dimorpha Hartmann
Loxoconcha elliptica Brady
Loxoconcha linleyi Horne
Loxoconcha malcomsoni Horne & Robinson
Loxoconcha multiornata Bate & Gurney
Loxoconcha nea Barbeito-Gonzalez
Loxoconcha ovulata (Costa)
Loxoconcha pontica Klie
Loxoconcha rhomboidea (Fischer)
Loxoconcha rubritincta Ruggieri
Loxoconcha stellifera G. W. Müller
Loxoconcha undulata Al-Furaih

Callistocythere crispata (Brady)
Callistocythere littoralis (Müller)
Callistocythere mediterranea (Müller)
Callistocythere murrayi Whittaker
Carinocythereis antiquata (Baird)
Carinocythereis carinata (Roemer)
Carinocythereis whitei (Baird)
Cathaycythere reticulata Whatley & Zhao
Cativella bensoni Neale
Celtia quadridentata (Baird)
Centrocypris viridis Neale
Cluthia keiji Neale
Costa batei (Brady)
Costa edwardsii (Roemer)
Costa punctatissima Ruggieri
Cypretta yapinga De Deckker
Cyprideis torosa (Jones)
Cypris decaryi Gauthier
Cypris latissima (G. W. Müller)
Cypris subglobosa J. de C. Sowerby
Cytherelloidea bonanzaensis Keij
Cytheretta adriatica Ruggieri
Cytheretta judaea (Brady)
Cytheretta teshekpukensis Swain
Cytheropteron brastadensis Lord
Cytheropteron elofsoni Lord
Cytherura gibba (O. F. Müller)
Elofsonia baltica (Hirschmann)
Elofsonia pusilla (Brady & Robertson)
Eucypris fontana (Graf)
Eucythere anglica Brady
Eucythere argus (Sars)
Eucythere declivis (Norman)
Eucythere prava Brady & Robertson
Gambiella caelata Witte
Ghardaglaia ambigua Neale
Hemicypris bairdi Martens & Wouters
Hemicypris dentatomarginata (Baird)
Hemicythere villosa (Sars)
Hemicytherura aegyptica Hartmann
Hemicytherura cellulosa (Norman)
Hemicytherura hoskini Horne
Hemicytherura videns (Müller)
Heterocyprideis macrotuberculata Masson & Whatley
Heterocypris luzonensis Neale
Heterocythereis albomaculata (Baird)
Heterocythereis voraginosa Athersuch
Hiltermannicythere emaciata (Brady)
Hiltermannicythere rubra (Müller)
Hirschmannia viridis (O. F. Müller)
Howeina camptocytheroidea Hanai
Ilyocypris monstrifica (Norman)
Ilyocypris schwarzbachi Kempf
Ilyocypris taprobanensis Neale
Ilyocypris quinculminata Sylvester-Bradley
Leptocythere baltica Klie
Leptocythere multipunctata (Seguenza)
Leptocythere porcellanea (Brady)
Leucocythere plena Zhao
Leucocythere weiningensis Zhao
Limnocythere shixiaensis (Wang)
Limnocythere xinanensis Zhao
Lindisfarnia guttata (Norman)
Loculicytheretta pavonia (Brady)
Loxoreticulatum fallax (G. W. Müller)
Metacypris aphthosa Zhao
Muellerina hazeli Coles & Cronin
Mutilus cimbaeformis (Seguenza)
Mutilus convexus (Baird)
Mutilus speyeri (Brady)
Nannocythere pavo (Malcomson)
Notiocypridopsis frigogena (Graf)
Oncocypris pustulosa Gurney
Paijenborchellina alata Gurney
Paijenborchellina venosa Gurney
Pallmoconcha laevata (Norman)
Paracytheridea cuneiformis (Brady)
Paracytheridea hexalpha Doruk
Paralimnocythere vulgaris McKenzie & Swanson
Patagonacythere devexa (Müller)
Pelecocythere sylvesterbradleyi Athersuch
Polycope choane Hasan
Polycope foraminosa Hasan
Polycope frigida Neale
Polycope regina Hasan
Procythereis iganderssoni (Skogsberg)
Procythereis torquata (Skogsberg)
Propontocypris pirifera (G. W. Müller)
Propontocypris trigonella (Sars)
Pterygocythereis jonesii (Baird)
Pterygocythereis siveteri Athersuch
Puriana fissispinata Benson & Coleman
Puriana pacifica Benson
Quadraleberis exquisita Bate & Sheppard
Radimella? aurita (Skogsberg)
Radimella darwini Pokorný
Radimella dictyon Pokorný
Radimella? floridana (Benson & Coleman)
Reticypris pinguis De Deckker
Robertsonites tuberculatus (Sars)
Rockallia enigmatica Whatley, Frame & Whittaker
Sagmatocythere napoliana (Puri)
Scottia audax (Chapman)
Semicytherura cornuta (Brady)
Semicytherura exudata Doruk
Semicytherura incongruens (G. W. Müller)
Semicytherura nigrescens (Baird)
Semicytherura ruggierii (Pucci)
Semicytherura sella (Sars)
Semicytherura sulcata (G. W. Müller)
Semicytherura tela Horne & Whittaker
Sinocytheridea impressa (Brady)
Sinocytheridea sinensis Hou
Stenocypris fernandoi Neale
Sulcostocythere knysnaensis Benson & Maddocks
Tanganyikacypris matthesi Kiss
Trachyleberis scabrocuneata (Brady)
Triebelina raripila (G. W. Müller)
Tyrrhenocythere amnicola (Sars)
Urocythereis favosa (Roemer)
Urocythereis labyrinthica Uliczny
Urocythereis phantastica Athersuch & Ruggieri
Xestoleberis aurantia (Baird)
Xestoleberis nitida (Liljeborg)
Xestoleberis postangulata Bate & Sheppard
Xestoleberis rubens Whittaker
Zabythocypris reduncа Athersuch & Gooday

Type-species of genera and subgenera

Abrotocythere quinquicornis Zhao
Acrocythere hauteriviana (Bartenstein)
Albileberis sinensis Hou
Angliaecytheridea calvata Sheppard
Apateloschizocythere geniculata Bate
Archeocosta alkazwinii Al-Bashir & Keen
Argenticytheretta (Chiliella) brunswickensis Rose
Argenticytheretta (Magallanella) chileana Rose
Australicythere polylyca (Müller)
Baffinicythere howei Hazel
Bathycythere vanstraateni Sissingh
Beninea ibecetenensis Apostolescu
Beyrichia (Sagenabeyrichia) siveteri Pollicot
Bilobatia serralobata Schallreuter
Bonnyannella robertsoni (Brady)
Braderupia asymmetrica (Neckaja)
Brephocharieis complicata (Salter)
Caboncypris nunkeri De Deckker
Callistocythere littoralis (Müller)
Calocaria maurae Vannier
Caprabolbina capra Schallreuter
Carinocythereis carinata (Roemer)
Cathaycythere reticulata Whatley & Zhao
Celtia quadridentata (Baird)
Chrysocythere cataphracta Ruggieri
Concavhithis latosulcatus Schallreuter
Costa edwardsii (Roemer)
Cyprideis torosa (Jones)
Cytheretta judaea (Brady)
Cytheretta (Flexus) plicata (V. Münster)
Cytheridea (Cytheridea) muelleri (V. Münster)
Cytherura gibba (O. F. Müller)
Donmacythere damottae (Colin)
Duplicristatia asymmetrica Schallreuter
Duringia spinosa (Knüpfer)
Elofsonia baltica (Hirschmann)
Eucythere declivis (Norman)
Femerensia gealbertii Schallreuter
Foramenella parkis (Neckaja)
Gambiella caelata Witte
Gammacythere ubiquita Malz & Lord
Glyptolichvinella spiralis (Jones & Kirkby)
Gotula gotlandica (Schallreuter)
Hamanella implexa Finger
Harperopsis scripta (Harper)
Hemicythere villosa (Sars)
Hemicytherura cellulosa (Norman)
Henningsmoenia gunnari (Thorsland)
Heterocythereis albomaculata (Baird)
Hirschmannia viridis (O. F. Müller)
Homeokiesowia frigida (Sarv)
Hornibrookella anna (Lienenklaus)
Howeina camptocytheroidea Hanai
Iberocypris cornutus Babinot
Karinutatia crux Schallreuter
Kefiella maresi Donze & Said
Keijella hodgii (Brady)
Kiesowia (Kiesowia) dissecta (Krause)
Klimphores planus Schallreuter
Leocytheridea polleti Keen
Lesleya bathonica Bate
Lindisfarnia laevata (Norman)
Loculicytheretta pavonia (Brady)
Lophocythere (Lophocythere) ostreata (Jones & Sherborn)
Lophocythere (Neurocythere) bradiana (Jones)
Loxoconcha rhomboidea (Fischer)
Loxoreticulatum fallax (G. W. Müller)
Maghrebeis tuberculata Majoran
Miehlkella cribroporata Schallreuter
Mutilus retiformis (Terquem)
Naevhithis naevus Schallreuter
Nannocythere pavo (Malcomson)
Navarracythere estellensis Colin & Rodriguez-Lazaro
Nigeroloxoconcha oniseguni Reyment
Notiocypridopsis frigogena (Graf)
Ommatokrithe prolata Ahmad
Paracytheromorpha rimafossa Maybury & Whatley
Paragrenocythere biclavata Al-Furaih
Parapokornyella taxyae (Babinot)
Pattersoncypris micropapillosa Bate
Pelecocythere sylvesterbradleyi Athersuch
Pennyella pennyi Neale
Phalcocythere horrescens (Bosquet)
Piretopsis (Cerninella) bohemica (Barrande)
Procythereis torquata (Skogsberg)
Procytheridea exempla Peterson
Progonocythere stilla Sylvester-Bradley
Propontocypris trigonella (Sars)
Pterygocythereis jonesii (Baird)
Quadraleberis exquisita Bate & Sheppard
Quadritia (Krutatia) iunior Schallreuter
Radimella dictyon Pokorný
Raimbautina hammanni Vannier
Reginea reginae Schallreuter
Renibeyrichia mulciber Siveter
Retinoda sulcata (Knüpfer)
Robertsonites tuberculatus (Sars)
Rockallia enigmatica Whatley, Frame & Whittaker
Sagmatocythere napoliana (Puri)
Sarlatina merlensis Babinot & Colin
Schallreuteria (Lippea) lippensis Schallreuter
Schallreuteria (Schallreuteria) superciliata (Reed)
Semicytherura nigescens (Baird)
Sinocythere sinensis Hou
Sinocytheridea impressa (Brady)
Slependia armata (Henningsmoen)
Spinohippula esurialis Vannier, Krůta & Marek
Spinoleberis eximia (Bosquet)
Stravia crossata Neale
Strepula concentrica Jones & Holl
Sulcostocythere knysnaensis Benson & Maddocks
Sylvestra posterobursa Doruk
Tanganyikacypris matthesi Kiss
Tanzanicythere pterota (Ahmad)
Theriosynoecum wyomingense (Branson)
Thibautina rorei Vannier
Togoina attitogonensis Apostolescu
Trachyleberis scabrocuneata (Brady)
Triadocypris spitzbergensis Weitschat
Tyrrhenocythere amnicola (Sars)
Urocythereis favosa (Roemer)
Uscopria memoria Schallreuter
Veenia (Nigeria) nigeriensis Reyment
Waiparacythereis joanae Swanson
Wehrlia olbertzae Schallreuter
Xestoleberis nitida (Liljeborg)
Xystista auricularis (Jones)